

The University of Chicago

THE SETTLEMENT OF THE MIAMI
VALLEY OF SOUTHWESTERN OHIO

A DISSERTATION SUBMITTED TO THE FACULTY
OF THE DIVISION OF THE PHYSICAL SCIENCES
IN CANDIDACY FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

DEPARTMENT OF GEOGRAPHY
1948

By
WILFRID GLADSTONE RICHARDS

CHICAGO, ILLINOIS

1948

The University of Chicago

THE SETTLEMENT OF THE MIAMI
VALLEY OF SOUTHWESTERN OHIO

A DISSERTATION SUBMITTED TO THE FACULTY
OF THE DIVISION OF THE PHYSICAL SCIENCES
IN CANDIDACY FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

DEPARTMENT OF GEOGRAPHY
1948

By
WILFRID GLADSTONE RICHARDS

CHICAGO, ILLINOIS
1948



PREFACE

The distribution of human beings over the surface of the earth is of paramount concern to the geographer, and the explanation of that distribution one of the most important tasks confronting him. "The Settlement of the Miami Valley of Southwestern Ohio" deals with the evolution of settlement in a portion of the Eastern Interior Lowland during the period of one hundred and fifty years of occupancy by American people. The pattern of distribution of that settlement is a dynamic phenomenon the major elements of which became fixed in the earlier stages of occupancy, and it is only through an examination of those stages that the pattern which has evolved can be understood.

Of necessity the treatment of a subject extending so far into the past is handicapped by the all too scant data available. Unfortunately that lack cannot be remedied by field investigation, for the periods for which data are most lacking are the most remote, and data for the years which could be most readily supplied by field investigation are those most fully covered by reports of government agencies. Systematic field work has, therefore, not been attempted. Nevertheless, the writer is not without first-hand knowledge of the area, for he has lived nearly twenty years in it and has examined practically every part of it in connection with this investigation.

In order to map the settlement pattern through the years it has been necessary to construct maps showing township and city boundaries as they existed at various times. For help in securing the necessary data for that task I am indebted to officials in the offices of the recorders and engineers in sixteen counties as well as to those in many city offices. Mr. Edgar W. King, Librarian, and Mr. Leland S. Dutton, Reference Librarian in the Miami University Library, have been unstinting in their efforts to aid in locating and securing materials, and to them I am deeply grateful. To Professors Charles C. Colby and Henry M. Leppard of the Department of Geography, The University of Chicago, I am under much obligation. The former made invaluable suggestions at the outset of the work and has given it constant encouragement; the latter

has guided the writing of the dissertation to completion. To both of them I hereby express my gratitude. To my wife, Helen Miller Richards, I make grateful acknowledgment for constant encouragement and invaluable help in the final revision of the manuscript.

Oxford, Ohio
December, 1947

Wilfrid G. Richards

CONTENTS

	Page
PREFACE.	111
LIST OF TABLES	1x
LIST OF ILLUSTRATIONS	x
Chapter	
I. THE MIAMI VALLEY	1
Distribution of Settlement	
Urban Centers	
Agricultural Area	
Urban-Rural Fringe	
Economic Functions of Urban Centers	
Types of Manufacturing	
Distribution of Types of Manufacturing	
Metropolitan Cincinnati	
Urban centers of the Miami and Mad rivers	
Urban centers on the Till Plain	
Economy of the Agricultural Area	
General Commercial Farming	
Nonfarm Population in the Rural Area	
Settlement in the Urban-Rural Area	
Economy of the Rural-Farm Population	
Economy of the Rural-Nonfarm Population	
Growth and Basis of Settlement	
II. OCCUPATION OF THE LAND	17
First Settlement	
Miami Purchase	
Founding of Cincinnati	
Outposts Established	
Spread of Settlement, 1795-1800	
Routes and Means of Travel	
Subdivision of Land	
Lands Chosen for Settlement	
Importance of drainage	
Spread of settlement in Montgomery County	
Incipient Towns	
Pioneer Economy	
Spread of Settlement, 1801-1810	
Frontier in 1810	
Economic Changes	
Movement by river	
Opening new roads	
Growth of manufacturing	
Distribution of Settlement in 1810	
Spread of Settlement Beyond the Miami Valley	
Growth of Rural Population	
Transportation by River	
Development of Roads	

CONTENTS--Continued

Chapter	Page
Building and Use of Canals	
Development of Agriculture	
Rural Manufacturing	
Growth of Towns and Cities	
Growth of Urban Labor Supply	
Towns on the Till Plains	
Miami and Mad River Towns	
Ohio River Towns	
Cincinnati	
Growth of commerce	
Growth of manufacturing	
End of Pioneer Days	
III. PERIOD OF INDUSTRIAL AND AGRICULTURAL DEVELOPMENT .	57
Distribution of Settlement in 1900	
Changes in Rural Settlement	
Areas Which Increased in Density	
Development of transportation	
Development of drainage	
Area Which Decreased in Density	
Causes for the decrease	
Effect of migration upon population density	
Time of Maximum Population Density	
Changes in Agriculture	
Growth of Rural Villages	
Growth of Urban Population	
Central and Northern Urban Centers	
Growth of employment in manufacturing	
Reasons for the growth of manufacturing	
Changes in the kinds of goods manufactured	
Other types of employment in urban centers	
Metropolitan Cincinnati	
Areal growth of the city	
Cincinnati's loss of its dominant position	
Changes in occupations	
Advantages and disadvantages of Cincinnati	
as a site for manufacturing	
Employment in manufacturing	
Fifty Years of Development	
IV. INCREASING URBAN CONCENTRATION OF SETTLEMENT. . .	89
Increase in Population	
Changes in Settlement	
Urban Growth	
Rate of Growth	
Growth of Employment in Manufacturing	
Manufacturing employment in Middle Miami	
Valley	
Manufacturing in smaller urban centers	
Manufacturing in employment in Metropolitan	
Cincinnati	
Changes in Occupations	

CONTENTS--Continued

Chapter	Page
Growth of Urban-Rural Fringe	
Settlement in the Agricultural Area	
Causes of Decline in Population	
Changes in Agriculture	
Development to a Turning Point	
V. SETTLEMENT AFTER ONE HUNDRED AND FIFTY YEARS. . . .	105
Distribution of Settlement	
Urban Settlement	
Metropolitan Cincinnati	
Industrial centers of the Middle Miami Valley	
Cities of the Upper Miami River and the Till Plains	
Rural Settlement	
Agricultural areas	
Urban-rural fringe	
Basis of Settlement: Manufacturing	
Distribution of Workers	
Types of Manufacturing	
Manufacturing and Urban Growth	
Cincinnati: Manufacturing and urban growth	
Dayton: Manufacturing and urban growth	
Piqua: Manufacturing and urban growth	
Basis of Settlement: Agriculture	
Distribution of Farm Labor	
Changing Agricultural Settlement in Preble County	
Basis of Settlement: Retail Trade	
Distribution of Workers	
Retail Trade in Metropolitan Cincinnati	
Retail Trade in the Middle Miami Valley	
Dayton	
Springfield	
Smaller retail trade centers	
Retail Trade in Outlying Urban Centers	
Basis of Settlement: Wholesale Trade	
Cincinnati as a Wholesale Trade Center	
Wholesale Trade in Dayton	
Basis of Settlement: Transportation and Communication	
Basis of Settlement: Construction, Business, Professional, and Personal Services	
Settlement After One Hundred and Fifty Years	
APPENDIX	
NOTES ON FIGURES	137
BIBLIOGRAPHY	140

LIST OF TABLES

Table	Page
1. Gainfully Employed by Industry Groups, Miami Valley, 1940	6
2. Freight Receipts at Cincinnati via Miami and Erie Canal	41
3. Rate of Growth of Population, Miami Valley and Cities, 1810-50.	45
4. Population and Number of Occupied Persons, Miami Valley Towns, 1840.	48
5. Population and Occupied Persons, Cincinnati, 1795-1850	50
6. Percentage Distribution of Workers in Manufacturing Industries, Cincinnati, 1826, 1841, 1851	54
7. Comparative Crop Acreages in the Miami Valley.	68
8. Employed Persons in Eaton, 1875	71
9. Population and Rate of Growth, Miami Valley Cities, 1850-1900.	72
10. Occupations of the Gainfully Employed, Dayton, 1880 and 1900, and Springfield, 1900	79
11. Occupations of the Gainfully Employed in Cincinnati, 1870 and 1900	82
12. Persons Employed in Manufacturing in Cincinnati, 1860 and 1899	85
13. Average Number of Wage Earners Engaged in Manufacturing, Miami Valley Cities, 1899 and 1929.	94
14. Percentage of Workers by Industry Groups, Miami Valley Cities, 1930	98
15. Percentage of Workers by Industry Groups, Miami Valley Cities, 1940	113
16. Persons Employed in Manufacturing, Miami Valley and Principal Cities, 1939	114
17. Number of Workers and Percentage of Population Engaged in Retail Trade, Miami Valley Cities, 1939	127

LIST OF ILLUSTRATIONS

Figure	Page
1. Location of the Miami Valley in Southwestern Ohio .	xii
2. Distribution of Settlement, 1940	2
3. Land Forms.	4
4. Railway Development.	10
5. Distribution of Settlement, 1794	18
6. Distribution of Settlement, 1800	22
7. Land Purchase in Northern Butler Township, Montgomery County	26
8. Distribution of Settlement, 1810	30
9. Distribution of Settlement, 1850	36
10. Distribution of Settlement, 1900	58
11. Changes in Rural Settlement, 1850-1900	60
12. Distribution of Manufactural Workers, 1899	74
13. Distribution of Settlement, 1930	90
14. Distribution of Manufactural Workers, 1939	110
15. Distribution of Agricultural Workers, 1940	122
16. Distribution of Workers in Trade, 1939	126



Fig. 1

CHAPTER I

THE MIAMI VALLEY

In the Miami Valley of Southwestern Ohio a line of urban centers extends northward from the Ohio River, surrounded by an indeterminate urban-rural zone merging with farmlands beyond. By 1940, 1,000,000 people lived in urban centers; while outside the centers lived 500,000 more. Reaching northward from the Ohio for 100 miles, and 70 miles in width, the 7,000 square miles constituting the Valley form a segment of the Eastern Interior Lowland (Fig. 1). The agriculture of that segment is a part of the Corn Belt; its line of manufacturing centers projects like a finger southward from the northeastern industrial belt. The Valley, a shallow physical depression, drained by the Miami and Little Miami rivers, is roughly coincident with sixteen counties. Across the Valley from east to west pass important lines of railways connecting industrial centers of the Mid-West with those of the East Coast; while other lines of communication, intersecting them, unite northern cities with those of the South. The navigable Ohio River, fringing the Valley on the south, forms a link with the industrial regions and coal fields to the east, and with the South and Southwest.

In the Miami Valley, as in other parts of the Interior Lowland north of the Middle and Lower Ohio, the early pioneers cut traces through the forest, built crude cabins, and made clearings in which to begin subsistence agriculture. In time local mills and shops were built to manufacture for community needs. With the passage of the years traces gave way to roads, canals, and railways; cabins were replaced by frame and brick houses; and subsistence agriculture became commercial agriculture. Commerce grew and local mills and shops were replaced by larger and larger factories in the towns and cities, but in the Miami Valley, in contrast to valleys east and west of it, industrial growth assumed the dominant role and made the area a significant segment of the industrial economy of the country.

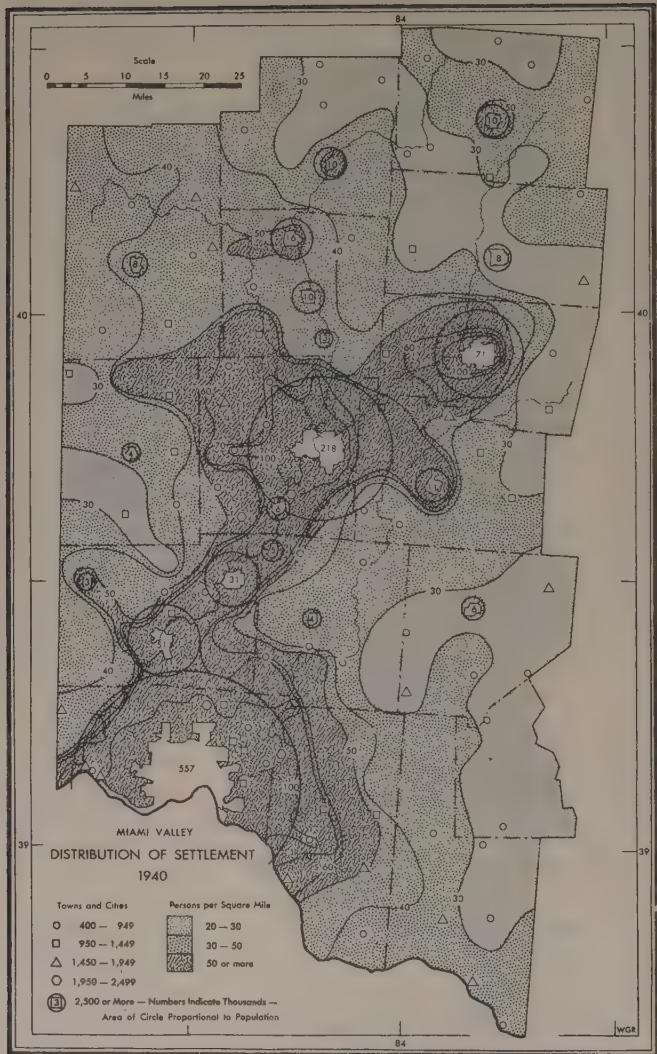


Fig. 2

Distribution of Settlement

The map showing the distribution of settlement in the Miami Valley in 1940 (Fig. 2) shows three distinctive types of settlement areas: urban centers, where people are crowded together in relatively small spaces; an agricultural area, where the people are rather widely dispersed; and the urban-rural fringe, an area where the densities lie between those two extremes.

Urban Centers

Approximately thirty villages, towns, and cities of more than 2,500 persons contain nearly 70 per cent of the population of the Valley.¹ Altogether those urban centers are the homes of more than 1,000,000 people, Metropolitan Cincinnati alone having a population of 577,000.²

Metropolitan Cincinnati and the other more important cities of the Valley, namely, Dayton, Springfield, Hamilton, Middletown, and Piqua, as well as several smaller urban centers, lie in the troughs of rivers eroded in the gently rolling till plain overlying nearly horizontal strata of limestone and shale which make up the Miami Valley (Fig. 3). Floodplains and outwash terraces are the sites of the business cores of those riverside urban centers. Outlying parts climb the eroded margins of the stream-troughs to the plains above. In the south, along the Ohio River, the bottomlands of the troughs and the dissected trough margins are wider, and the relief greater than in the northern part of the Valley. Along the Ohio the eroded margins are from two to eight miles in width and the relief is some 400 feet. In the north, the stream-trough margins are more than one-half mile in width in a few places only, and the relief is generally less than 100 feet. Other smaller urban centers lie on the till plain.

¹Unless other sources are given, statistical data used in the text are from the reports of the United States Census. The volumes and pages are indicated in the tables and in "Notes on Figures" in the Appendix.

²The term "Metropolitan Cincinnati" as used here means the city of Cincinnati and all its incorporated suburbs in Ohio. It includes all incorporated places in Hamilton County except Harrison, Loveland, and Milford. It is not the same area as the one designated as the "Cincinnati Metropolitan District" by the Bureau of the Census in 1940.

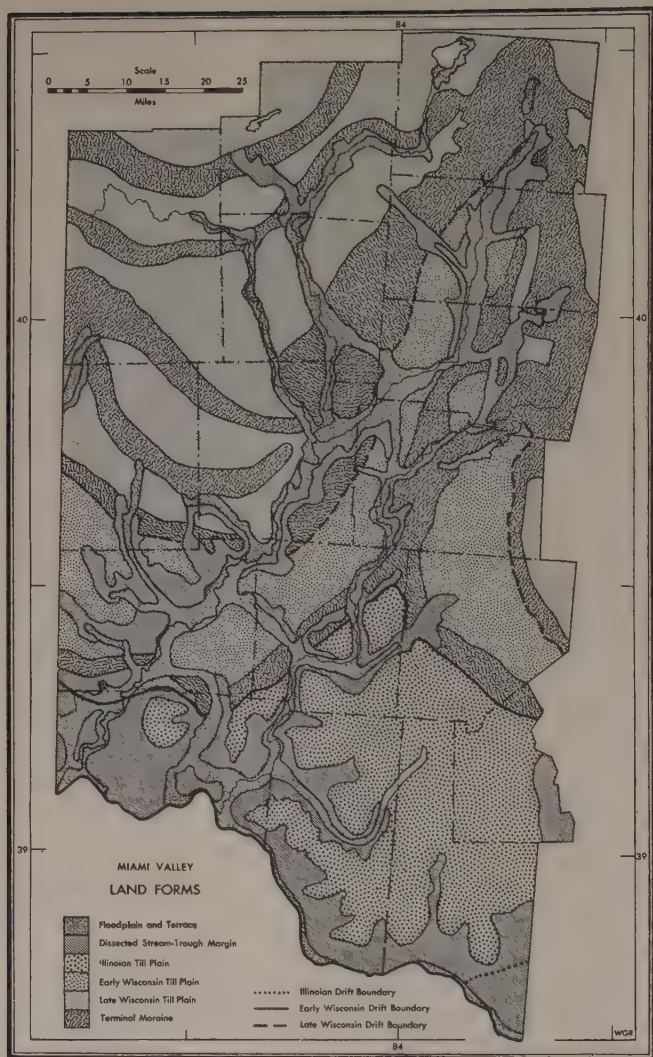


Fig. 3

Agricultural Area

In 1940 about two-thirds of the total area of the Miami Valley had a population density of fewer than fifty persons per square mile. Indeed, most of the agricultural area had fewer than forty persons per square mile, for the isopleths of forty parallel the isopleths of fifty throughout much of their length and within a very few miles of them (Fig. 2).

Parts of the agricultural area are on all types of land-form found in the Valley, but the greater extent of them are on the area of gently undulating till plain, with its associated terminal moraines. The glacial deposits are the result of three periods of deposition, which were from south to north Illinoian, Early Wisconsin, and Late Wisconsin. The areas covered by each are shown in Figure 3. For the most part, the terminal moraines are moderately rolling, and only locally do they have noticeably steep slopes and marked relief. The greater part of the plain is drained by the Miami and Little Miami rivers. In the south, a part of the area is drained by creeks emptying directly into the Ohio; while small sections in the northwest and along the eastern border drain to the Wabash and Scioto rivers, respectively. Except near the Ohio, where maturity has been reached and there is a considerable amount of steeply sloping land, most of the erosion is in the youthful stage and the headwaters of the rivers rise on almost level lands, poorly drained at the time of first settlement.

Urban-Rural Fringe

The urban-rural fringe was an irregularly shaped area in 1940 with a population density of more than fifty persons per square mile. The area was wide in the south where, surrounding Metropolitan Cincinnati, it spread over bottom land, hill slopes, and parts of the till plain (Fig. 2). Northward the urban-rural fringe narrowed greatly between Hamilton and Middletown and then widened again as it approached Dayton. From the vicinity of Hamilton northward its axis lay in the trough of the Miami River but it spread on to the till plain on both sides. From the vicinity of Dayton there were three outward extensions: one westward and northwestward across the till plain into Preble, Darke, and Miami counties; one northeastward along the trough of Mad

River; and a minor extension to the southeastward across the Little Miami trough to the till plain surrounding Xenia.

Economic Functions of the Urban Centers

In 1940, the urban centers were the homes of 72 per cent of all the gainfully employed workers who lived in the Miami Valley. In addition, they were the places of employment of many thousands more. The significance of the urban centers in the life of the Valley is, therefore, very great.

It is evident from the percentages given in Table 1 that

TABLE 1
GAINFULLY EMPLOYED BY INDUSTRY GROUPS,
MIAMI VALLEY, 1940

Industry Group	Number ^a	Per Cent
Manufacturing.....	182,044	34.8
Retail trade.....	78,125	14.9
Agriculture.....	48,858	9.3
Personal service.....	44,992	8.6
Professional service.....	38,245	7.3
Transportation, communication, and other public utilities.....	33,145	6.3
Construction.....	25,792	4.9
Government.....	17,942	3.4
Finance, insurance, and real estate.....	16,796	3.2
Wholesale trade.....	14,053	2.7
Automobile and business repair service.....	10,530	2.0
Amusement and recreation.....	4,519	0.9
Mining.....	908	0.2
Industry not reported.....	7,366	1.5
Total.....	523,315	100.0

Source: U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Population, Vol. II, Part 5 (Washington: Government Printing Office, 1943), pp. 590-600.

^aExcludes the part of Highland County which lies in the Miami Valley.

manufacturing, which employed 35 per cent of the workers, was the major source of income of the population. Bureau of the Census figures also reveal that 70 per cent of the factory workers lived

in the seven cities of more than 10,000 inhabitants. Data collected by the Ohio Department of Industrial Relations¹ indicate that 96 per cent of all factory workers in the Miami Valley in 1939 were employed in places of more than 2,500. Bureau of the Census data also show that 64 per cent of those employed in all other industry groups except agriculture, lived in the seven cities of more than 10,000.

Types of Manufacturing

Manufacturing in the Miami Valley is diversified, though there is great emphasis on production of articles of metal which in 1939 employed 50 per cent of the factory workers.² Each of four other groups--preparation of food, printing, manufacturing of textile articles, and manufacturing paper and paper products--employed more than 5 per cent of the factory workers.

Most of the manufacturing is of the secondary type. In 1939 only 5,000 of the 100,000 workers in the metal industries were engaged in making steel itself; the number employed in textile mills and in tanning leather was small compared to the number engaged in fabricating products of textiles or leather. Only in the paper group was the number employed in making paper itself larger than the number employed in making paper products.

A considerable part of the metalworking involves the making of machinery of the precision type. Many of the other types of manufacture also involve considerable skill. In 1940 evidence of the relatively high skill involved in making many of those things was found in the percentage of all workers classified by the Bureau of the Census as "craftsmen, foremen, and kindred workers." The percentages were:

United States	11.2 per cent
Ohio.	14.5 " "
Miami Valley.	15.4 " "

Distribution of Types of Manufacturing

While some urban centers in the Valley specialize in the production of certain commodities, there is not a great deal of

¹Department of Industrial Relations, *Directory of Manufactures in Ohio: 1939* (Columbus: Department of Industrial Relations, n.d.), pp. 157-323.

²Ibid.

difference between the various industrial centers. All parts of the Miami Valley, if they have rail connection, have about the same advantages with respect to access to markets and raw materials, and labor is sufficiently mobile to be available where it is needed. In many respects, therefore, the factors which caused differentiation in localization of manufacturing are relatively minor ones. Perhaps the most important of those is water supply and the size of the local market. For convenience the urban centers can be divided into three groups: (1) Metropolitan Cincinnati, (2) those along the Miami and Mad rivers, and (3) those on the till plains some distance away from the rivers.

Metropolitan Cincinnati.--The 577,000 people who lived in Metropolitan Cincinnati in 1940 made up nearly 40 per cent of the population of the entire Miami Valley, and its gainfully employed included a disproportionately large part of those engaged in transportation, trade, and finance. The percentages engaged in manufacturing and construction were about normal for the Valley. All the types of manufacture found in the Miami Valley were represented in Metropolitan Cincinnati, but a proportionately greater number of workers engaged in food preparation, printing, manufacturing of clothing, leatherworking, woodworking, and soap making.

The principal factory areas as well as the business core of Cincinnati are on the bottom lands. Portions of the urban area spread along the Ohio for some twenty-five miles. Other lowlands within the metropolitan area are Mill Creek valley, the Norwood trough, and part of the Little Miami trough. All of those lowlands were channels of the Ohio before or during glacial times, and form the main routes by which the railways enter the city. The thick alluvium and till in the Mill Creek Valley and Norwood trough furnish ground water for several of the industrial suburbs and for some industries in the city itself, though Cincinnati secures most of its water from the Ohio.

From the relatively flat bottom lands the urban area spreads on to the maturely dissected edge of the plain, the general level of which is some 300 feet above the Ohio. The higher sections of the city are well above danger of Ohio River floods which have at times caused so much damage to some of the bottom land area, but communication between them and the lowland is difficult in parts of the city because of the steep and, in places,

even precipitous slopes.

Urban centers on the Miami and Mad rivers.--Nine urban centers are found on the Miami River, and one, Springfield, on the Mad River. Five of those, Dayton, Springfield, Hamilton, Middletown, and Piqua each has populations of more than 10,000. All are primarily concerned with manufacturing.

The manufacture of machinery is the most important type of industry in six of those urban centers. Machine tools, electrical equipment, and automotive parts are of special importance in Dayton, Springfield, and Hamilton. At Middletown the one rolling mill in the Valley produces steel.

Paper and paper products manufacture also employ large numbers of workers in all of the towns from Dayton southward. The largest number of workers engaged in making paper work in Hamilton, while Middletown has a large group engaged in making paper and paper products. Manufacture at Franklin is almost entirely of that type.

From Hamilton to Dayton, inclusive, the main business section and the larger part of the residential area of each of the urban centers lies on the left, or east bank, of the Miami. The larger portion of each of the urban centers north of Dayton lies on the right bank. The business cores of all those places are on the floodplains or outwash terraces. The residential sections of all of them extend up the dissected edge of the plain, and some of them on to the plain. All of the Miami River towns, except Middletown and Tippecanoe City, have spread across the river, some only on to the terraces, some across the terraces and on to the higher lands.

Springfield lies entirely east of the Mad River, the industrial and business section on terraces along its tributary, Buck Creek. Residential sections extend southward on to terminal moraines, and northward over the terraces north of Buck Creek and on to the terminal moraines beyond.

Main lines of railway from northwest, north, and northeast focusing on Cincinnati connect those river towns; while many of the towns are also on lines which cross the valley from east to west (Fig. 4). Most of the railways are through-lines giving connection with the industrial and commercial centers of eastern United States.

One of the important assets of the river-side towns is

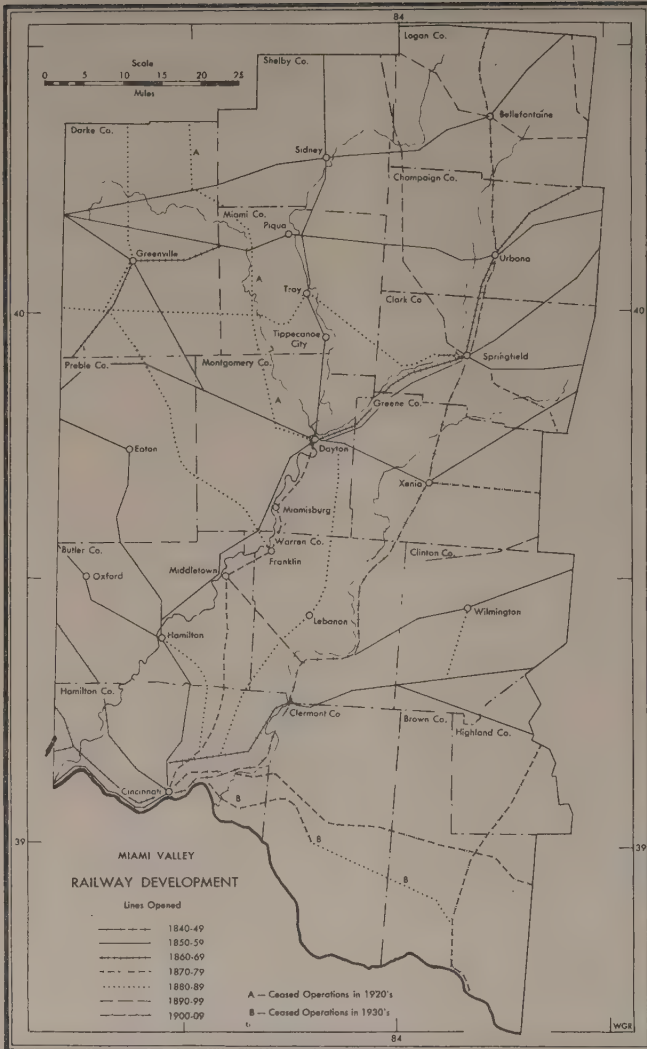


Fig. 4

the supply of water obtained from wells in the floodplains which tap layers of gravel. Water from the rivers is also used at some points to develop small amounts of power.

Urban centers on the till plain.--Eight places with more than 2,500 persons, of which seven are county seats located approximately in the center of the counties which they serve, lie on the till plain away from the major rivers. Five of the seven are of more importance than the others because, in addition to being local governmental and trading centers, they have some industrial development. In 1940 those five had populations ranging from 6,000 to 10,600. All the five are served by two or more of the railway lines which cross the till plain (Fig. 4). In three of those towns, Bellefontaine, Urbana, and Wilmington, metalworking is the leading type of manufacturing. Xenia and Greenville have more diversified industries, with manufacture of cordage leading in the former and men's clothing in the latter.

In contrast to the larger five county-seat towns, the smaller ones, with between 3,500 and 4,000 persons are each on but one railway line. In addition to their governmental functions they are local trading centers.

Economy of the Agricultural Area

Population densities in the agricultural area are from twenty to fifty per square mile. Within that area, 75 per cent or more of the population was classified as "rural-farm" in 1940. While that area is by far the most extensive in the Miami Valley, it directly supports relatively few people. The total engaged in agriculture in the Valley, including the urban-rural fringe, was in that year but 9 per cent of those gainfully employed.

General Commercial Farming

Farming in the Miami Valley is of the Corn Belt type. While the proportion of land used for corn and the density of hogs is not as great in the Miami Valley as it is farther west in the Corn Belt, the general system of farming is the same. In such characteristics as number of automobiles, motor trucks, and tractors on farms, and of telephones, water systems, and electricity in the farmhouses, the Miami Valley is very similar to the remainder of the Corn Belt and definitely aligns itself with the more productive farm lands of the country.

Six of the "Type-of-Farming" areas delineated by the Bureau of the Census¹ lie partly within the Miami Valley. Since those types are based on sources of income of the farmers, the fact that six of them are represented seems to indicate considerable differences in farming practices in different parts of the Valley. In spite of some local differences, however, agriculture throughout the Valley exhibits a number of common characteristics.

In 1940 in every county in the Miami Valley corn occupied at least 30 per cent of the crop acreage and in the majority of counties more than 40 per cent so that corn fields, corn cribs, and silos were seldom missing from the rural landscape. Wheat occupied about one-half as much land as corn; and hay crops, chiefly clover, ranked third. About 30 per cent of the land was used for pasture.

That combination of crops is suited to the humid microthermal climate, and to the gray-brown podzolic soils which have developed from parent material of glacial origin, derived chiefly from limestone and shale. The majority of the soil types are silty loams or silty clay loams. Since most of the soils are of fine composition, water seeps downward but slowly, and tile drainage of cultivated fields is common. In the southern part of the area natural drainage is sufficiently well developed to make it possible for the individual farmer to find natural outlets for drain tile. In much of the northern part, especially on the Late Wisconsin till, it has been necessary to construct drainage ditches by community action.

Throughout the Valley in 1940, moderate-sized barns indicated something of the significance of livestock. Dairy cattle and hogs were the most common farm animals but there were a number of beef cattle fattened in the area also. Poultry were found on most of the farms but the number of farms making poultry their chief interest was small. In the agricultural area more than one-half of the farms received their principal income from the sale of livestock and field crops. A very much smaller group received their principal income from dairying.

In the same year in the parts of the agricultural area on the Wisconsin till the average amount of crop land per person

¹U. S. Bureau of the Census, Fifteenth Census of the United States. Census of Agriculture. Types of Farming in the United States (Washington: Government Printing Office, 1933), map in pocket.

engaged in agriculture was from forty to fifty acres; on the Illinoian till, twenty to thirty acres. The most extensive soil types on the Wisconsin till have productivity ratings of from "1" to "5," and on the Illinoian till, from "5" to "7." The highest productivity rating of Ohio soils is "1."¹ The larger amount of land per worker and the higher fertility of the Wisconsin till is reflected in the better farm homes, barns, farm equipment, and roads than those found in the Illinoian till section.

Tobacco is a crop grown in two localities, the Miami Cigar Filler area in eastern Darke and Preble and in western Montgomery and Miami counties, and the Burley tobacco area in Clermont and Brown counties. The cigar tobacco area on the till plain and the Burley area on the more steeply sloping lands near the Ohio River are characterized by a greater density of farmhouses and out-buildings than are found in other parts of the rural area.

Nonfarm Population in the Rural Area

Scattered through the rural area are nearly ninety incorporated villages and many unincorporated hamlets. Figures showing the occupations in the rural places are not available except in the case of manufacturing. They show a relatively small number of workers, employed mainly by feed mills, dairies, and seasonal industries such as vegetable canning and tobacco rehandling, to prepare agricultural products for market. There are also a few other types of manufacturing represented by scattered factories such as the shoe factories in Brown County. The most important economic function of the rural communities is retail distribution. To some extent those communities serve as collection centers for agricultural products, but the use of the motor truck in marketing farm products has resulted in a large part of the farm products by-passing those smaller centers.²

¹G. W. Conrey and A. H. Paschall, A Key to the Soils of Ohio, Special Circular No. 44 (Wooster: Ohio Agricultural Experiment Station, 1934), p. 10.

²Alfred J. Wright, "The Industrial Geography of the Middle Miami Valley, Ohio," Papers of the Michigan Academy of Science, Arts and Letters, Vol. XXI (1935), pp. 417-418.

Settlement in the Urban-Rural Fringe

In the urban-rural fringe the density of rural population in 1940 was mostly between fifty and seventy persons per square mile. Areas of more than one hundred per square mile, extensive enough to map, were found only in the vicinity of Cincinnati and Dayton. Locally within that inner fringe the density reached one thousand or more per square mile. The percentage of rural-farm population in most townships was between nine and forty. Throughout the urban-rural fringe there are many sections where non-farm houses are closely spaced between farmhouses for miles along the roads with farm fields adjoining their backyards. Rural villages also contain homes of many city workers. Near the cities there are blocks of houses, often indistinguishable from parts of the cities within the corporation lines.

A considerable part of the urban-rural fringe lies on the floodplains and terraces of the Miami, Mad, Little Miami, and Ohio rivers, extending on to the eroded edge of the plain, and in many places on to the plain itself. The hillier stream-trough margins and some moraines make attractive sites for country estates as well as for many less pretentious homes. Some sections close to the rivers are subject to occasional overflow and some rather densely settled areas in the vicinity of Dayton and Middletown would be subject to severe floods if it were not for flood control works.

Economy of the Rural-Farm Population

Agriculture is fundamentally of the same kind as is found in the agricultural area, though there are some differences growing out of nearness to the urban centers. In the urban-rural fringe in 1940, the proportion of small farms, of self-sufficing farms, and of farmers who obtained some income from work done off the farm was greater than in the agricultural area. Dairy farms were also proportionately more numerous, as were nurseries and farms growing vegetables for sale. In spite of those differences the major source of income of the farmers was in that year, as in the rural area, derived mainly from the sale of field crops and livestock.

Economy of the Rural-Nonfarm Population

The greater part of the gainfully employed who live in the urban-rural fringe find employment in the nearby industrial centers. In 1940 there were 8,000 factory workers among the rural-nonfarm population in Hamilton County and a like number in Montgomery County. Nor is all the industrial employment within the cities, for oil refining and fertilizer manufacturing in Hamilton County are carried on in the urban-rural fringe. Farther north three paper mills are located between Hamilton and Middletown.

Growth and Basis of Settlement

The urban centers, the urban-rural fringe, and the agricultural area of the Miami Valley are the results of one hundred and fifty years of settlement. Permanent settlement began in 1788 and led to a rapid occupation of the land, so that there was settlement in all parts of the Valley by 1850. A period of adjustment, during which rural settlement reached its maximum and was surpassed by the growth of urban settlement, ended about 1900. From 1900 to 1930 the Valley experienced development which brought the settlement pattern to essentially the stage it had reached by 1940. The analysis of those three periods of sequent occupance comprises the following three chapters. The final chapter presents, in greater detail than is possible for the earlier ones, the basis of the settlement pattern of 1940 described in this first chapter.

Since the great majority of the persons living in the Valley are dependent, directly or indirectly, on wages earned for their livelihood, employment in various industry groups is the basis of the settlement pattern. In explaining the distribution of settlement in the following chapters, therefore, much attention will be given to statistics of occupation and employment. Unfortunately such data are by no means complete, and a balanced treatment of the part played by the various industries in the development of the settlement pattern is not possible. For the period of settlement, data regarding manufacturing and agriculture are more abundant than for other forms of activity, and it has been possible to deal with those two types of industry more fully than with the others. Thus there is a weakness in the treatment,

one which would be even more serious, were it not for the fact that manufacturing and agriculture are the economic foundations of the Miami Valley settlement.

CHAPTER II

OCCUPATION OF THE LAND

Settlement had gained a foothold in the Miami Valley by 1790, and two streams of settlers converged upon it pushing the frontier rapidly northward. One stream came from Kentucky, the other from the Middle Atlantic States by way of the Ohio. So rapidly did the northward movement take place that within fifty years there was settlement in all parts of the Valley.

Northward movement was at first hindered by opposition of the Indians, uncertainties and confusion concerning land titles, and lack of roads and usable waterways. Those handicaps failed to hold the settlers in check for long. Indian opposition was largely overcome by 1795. With the exception of the northern fringe of the Valley, all the lands were legally open to settlement soon after 1800, and development and improvement of means of transportation accompanied and followed rather than preceded settlement.

In 1790, the population of the Miami Valley was probably less than 1,000. Ten years later it was approximately 15,000¹ and by 1810, nearly 80,000. During the next decade the growth was 136 per cent, bringing the total to 184,000. Gains of from 36 to 44 per cent were made in succeeding decades to 1850 when the total reached 512,000. That was not a simple movement of people into the Valley to fill it. Rather there was a constant stream of people moving in, some staying only a few years before moving on, others settling permanently. Many, perhaps most, of the original settlers soon went farther west, leaving no other trace of their presence than a little clearing in the forest and a crude log cabin. Others stayed for a number of years, making very considerable improvements in their farms, before succumbing to the lure of new lands.

The growth of population in the Miami Valley before 1850

¹R. C. Downes, Frontier Ohio, 1788-1803 (Columbus: The Ohio State Archaeological and Historical Society, 1936), p. 207.

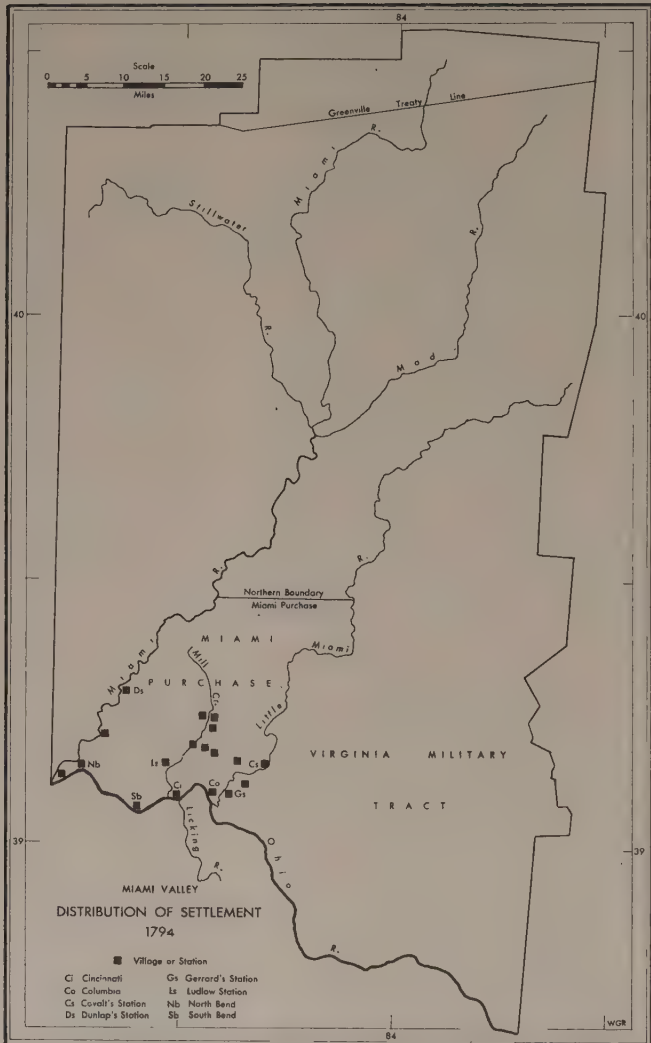


Fig. 5

involved the development of an agricultural area with rural trade centers. It also involved the development of rural manufacturing and manufacturing towns which served local needs and also a wider market than that provided by the Valley itself. During that period Cincinnati also became a commercial center of regional and inter-regional significance.

First Settlement

Three settlements were established along the banks of the Ohio between the two Miamis in the winter of 1788-89. By the end of 1794 fifteen additional settlements had been made (Fig. 5). Due to the fear of Indian attacks the pioneers of those first few years built clusters of cabins, some of them surrounded by stockades. That was a form of settlement in marked contrast to the dispersal which characterized occupation of the remainder of the Valley.

Miami Purchase

The first three settlements were between the two Miamis because of the activities of John Cleves Symmes and his associates, who were purchasing land between the rivers for sale to pioneers. Neither the Virginia Military Tract to the east of the Little Miami nor the lands to the west of the Miami were yet available for settlement. The purchase of the land between the Miamis from the government and its sale to settlers was not well handled and arrangements with the government, including the determination of the northern boundary, were not completed until 1794.¹ Nevertheless, the organized effort to promote colonization led to a movement down the Ohio creating a new gateway to the Northwest Territory 300 miles farther down the river than the one established at Marietta a few months earlier. Since Symmes and his partners were from New Jersey, the majority of the settlers recruited for the occupation of the Miami Purchase were from the Middle States²

¹C. E. Sherman, Ohio Topographic Survey, Final Report, Vol. III (Columbus: Ohio State Reformatory, 1925), p.70.

²Beverly W. Bond, Jr., The Foundation of Ohio, Vol. I of The History of the State of Ohio, ed. Carl Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1941), pp. 278 and 311.

but many persons from Kentucky also joined the settlement north of the Ohio.

Founding of Cincinnati

Of the three settlements established in the Miami Valley during the winter of 1788-89 one, Cincinnati, soon forged ahead of the other two, Columbia and North Bend. Cincinnati's success was due to the fact that it occupied the most suitable and strategic location of the three sites.

Cincinnati, first called Losantiville, was established by a group of men who had been engaged in Indian warfare and trade and who were familiar with the terrain. The site of their settlement was on the largest lowland along the Ohio between the Little Miami and the Miami rivers. That lowland consisted of a narrow strip of floodplain about three miles in length, backed by an outwash terrace extending in its widest part two miles from the river. The terrace was one hundred and ten feet above low water and thirty feet above the highest flood level. Fringed by bluffs on the landward side the entire lowland came to be known locally as the "Basin." In its extent and in its elevation that lowland surpassed any other along that part of the Ohio. The site, however, had even greater significance because it was at the crossing point of two significant routes. One of those was the Ohio itself, the other, at right angles to the Ohio, gave easy approach to the river crossing, for on the south the valley of the Licking River led to already settled Central Kentucky, and on the north the valley of Mill Creek formed a water-level route from the Ohio through the upland to the Miami River trough. The point at which that north-south route, long used by Indians and fur traders, crossed the Ohio was, therefore, the logical place for a trading point and for an outpost against the Indians.

In contrast neither Columbia, on the floodplain at the mouth of the Little Miami, nor North Bend, on a narrow neck of land which separated the lower course of the Miami River from the Ohio, was suited to be the site of the main settlement. Neither was at the crossing of the already used routes and the site of Columbia was subject to flooding, as its founders discovered during their first winter, while that of North Bend lacked sufficient level land for expansion.

Late in 1789 Losantiville's position was strengthened by

the erection of Fort Washington, the strongest military post in the western country. Fort Washington not only provided the settlement with protection against the Indians who were exceedingly troublesome for several years, but its garrison also provided a market which encouraged the growth of agriculture and trade. That was particularly true when the fort became the assembling and outfitting point for armies which advanced up the Miami Valley in 1791 and 1794. Trade also developed in supplying the needs of settlers who left the river at Cincinnati to move into the interior, and of the many frontiersmen who were passing along the river toward the West.

Outposts Established

During 1789 two other settlements were established, one called South Bend, now Anderson's Ferry, in the narrowest part of the Ohio trough between Losantiville and North Bend. The second, called Covalt Station, on the Little Miami twelve miles from its mouth, consisted of seventeen cabins and formed the outpost covering Columbia.

Three outposts against the Indians were built in 1790, all away from the Ohio. One, Dunlap's Station, was erected beside the Miami River about seventeen miles across the upland from Cincinnati. The stockade there sheltered thirty persons.¹ The second outpost, Ludlow station, was in Mill Creek valley five miles from Cincinnati. A third station was built that same year, Gerard's, across the Little Miami from Columbia on Virginia Military Land. All of those early settlements were in the valleys (Fig. 5). Within the next two years ten other small settlements were built, some of them on higher land.

Because the danger from Indian attack was so great, people settled within stockades rather than scattering on farms. They went out by day to clear and cultivate their fields; although sometimes that practice was dangerous for the Indians not only attacked men in the fields, but in 1791 even fell upon Dunlap's Station.

Few figures are available to indicate the number of people who lived in the Miami Valley at that time for no census was taken in the Northwest Territory in 1790. Perhaps the best figure is

¹Ibid., p. 300.



Fig. 6

an estimate made by Jedidiah Morse, who in 1792 placed the total in the Miami Purchase at 2,000 persons,¹ most of whom apparently lived within sixteen miles of the Ohio River in less than half of the area now included in Hamilton County. While that was probably not a bad showing for the first four years, the very rapid expansion after 1794 indicates how effectively the Indian menace had restricted the northward movement of the frontier.

The defeat of the Indians at the Battle of Fallen Timbers on the Maumee River in 1794 ended the menace of Indian depredations and made an advance into all but the extreme northern part of the Miami Valley possible. By the subsequent Treaty of Greenville the Indians ceded to the Americans all the lands south of the Greenville Treaty Line. That line (Fig. 6) passed through the Miami Valley north of Bellefontaine and Sidney to Fort Loramie in Shelby County, thence west-northwestward, so that all of Darke County lies south of it. The restriction to up-valley movement thus ended, a stream of pioneers started northward, reaching the treaty line in Logan County by 1803.

Spread of Settlement, 1795-1800

The six years following the signing of the Treaty of Greenville witnessed a wild scramble for Miami Valley lands. By the end of 1800 settlement had reached a point about seventy miles north of Cincinnati. On foot, with pack-horses, with wagons, or in some instances by boat, some of the pioneers penetrated the lands between the Miamis using Cincinnati as their starting point. Others, pushing forward from various other places along the Ohio, moved into the Virginia Military Tract east of the Little Miami. There was nothing orderly about that settlement. Freed from the fear of Indians, the settlers scattered out, choosing what seemed to them the best lands. Isolated cabins sprang up miles apart. Only a small part of the area in which there was a dispersal of settlement was in reality fully occupied. The area in which there was by 1800 a skeleton of settlement amounted to some 2,200 square miles (Fig. 6).

The rapidity of movement was possible partly because a

¹U. S. Bureau of the Census, A Century of Population Growth from the First Census of the United States to the Twelfth, 1790-1900 (Washington: Government Printing Office, 1909), p. 55.

good deal of the area had already been examined by soldiers in the Indian campaigns, and that between the Miamis by surveyors employed by Symmes, who had penetrated as far north as the Mad River. Holders of warrants for land in the Virginia Military Tract had also staked out holdings, many of which were surveyed before 1795. By the end of 1794 there were hundreds of men in the settlements along the Ohio waiting eagerly for security from the Indians to make it possible for them to settle on their farms. Many others were waiting in Kentucky and the East. Even by the end of 1795 there were many cabins along the Ohio which had been deserted by families going northward.¹

Routes and Means of Travel

Settlers heading to the Miami Country from Kentucky came in wagons or with pack-horses. Those from the East floated down the Ohio in flatboats bringing horses or oxen and even wagons with them. The flatboats were sold for the wood in them at some point along the Ohio, most commonly at Cincinnati. From Pittsburgh or Wheeling the flatboats moved downstream, simply floating with the current. The way into the Miami Country itself was upstream, slow and laborious on the Miami, almost impossible on the Little Miami. Of the nine families and ten single men who formed the first contingent to reach the site of Dayton in the spring of 1796, but two families and two single men went by water, ascending the Miami in a pirogue.²

The land routes followed were for the most part trails or "traces" as they were appropriately called. The only road northward, some twenty-three miles in length, was the one from Cincinnati to Hamilton, cut through first by St. Clair's army in 1791 and later improved by Wayne's in 1794 (Fig. 6). Beyond Hamilton both armies had moved northward on routes west of the Miami in lands not available for settlement until later in 1801. A trace was cut through from Hamilton to Dayton along the east bank of the Miami in 1795.³ Another northward route of movement was along

¹Downes, op. cit., p. 67.

²J. F. Edgar, Pioneer Life in Dayton and Vicinity, 1796-1840 (Dayton: Dayton Flood Book Co., 1915), pp. 22-24.

³Harvey W. Crew, History of Dayton, Ohio (Dayton: The United Brethren Publishing House, 1889), p. 35.

Harmer's Trace, used by Harmer in his expedition against the Indians in 1790. That trace apparently followed Indian trails almost if not all the way, heading to lands on both sides of the Little Miami and to those along the Mad River.

Those two traces, one along the Miami and one along the Little Miami, seem to have been the main northward routes of travel. Some others between them may have been cut before 1800, and many branches undoubtedly were. Immigrants used existing traces where they found that they suited their purposes; where they did not, they cut their own. Since a great deal of that first northward movement in the period here considered was accomplished with the aid of pack-horses it was not necessary to clear wide paths, and changes could be made rather easily when new knowledge of the terrain showed it to be advantageous, or when wet ground necessitated it.

In 1799 a trace called the College Lands Road (Fig. 6) was cut through from Chillicothe probably as far as Lebanon, though later it penetrated to Hamilton and Oxford. Its name arose from the fact that it led to the Land Office Township which had been set aside for the support of higher education. That trace from the Scioto Valley was the first of the eastern gateways into the central Miami Valley.

Several traces were also made at that time across lands nearer the Ohio River. One of those followed the Ohio from the mouth of the Little Miami to the mouth of Bullskin Creek, a distance of about thirty-two miles; while another was laid out in 1798 from Newtown, near the Little Miami River, to Williamsburg.¹ Since a great deal of the settlement in the southeastern part of the Valley took place from various points along the Ohio, there must have been several traces leading northward from that river. One, Lane's Trace, was in use between the mouth of Bullskin Creek and Williamsburg at least as early as 1798.²

Subdivision of Land

Lands purchased from Symmes were surveyed on the township plan provided for in the Ordinance of 1785. Consequently land

¹History of Clermont County, Ohio (Philadelphia: L. H. Evarts, 1880), p. 87.

²Ibid., pp. 546-547.

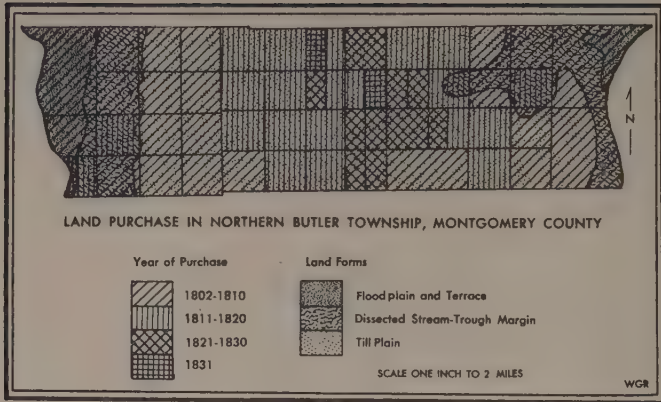


Fig. 7

holdings were at least roughly rectangular in shape and a common unit of purchase was one section. Lands north of the Miami Purchase and between the Miami Rivers were surveyed by order of Congress between 1801 and 1803, though many persons had settled in that area before 1800, either having purchased land from Symmes, who thought he had the right to sell it, or else having taken possession of it as squatters. In that area, which is known as the Between the Miamis Survey, a rectangular pattern of land occupance similar to that of the Miami Purchase was developed (Fig. 7).

The Virginia Military Tract was legally available for settlement after August, 1790, but, except for the outposts just east of the Little Miami, there was no settlement in the Miami Valley section of the Tract until 1796 (Fig. 5). In that area the original owners, Revolutionary War veterans from Virginia, or purchasers of veterans' warrants, staked out the land of their choice, frequently leaving the surveying and recording until some later time. The amounts of land so obtained varied greatly in size, many tracts containing 1,000 to 4,000 acres, though there were many smaller ones. Since the owners, or surveyors for them, chose the land which they considered the most valuable, the holdings were very irregular in shape. Many of the persons who obtained warrants were speculators who held parts of the land for many years before selling them to farmers, making the settlement more dispersed than it otherwise would have been.

Those who settled on the lands west of the Miami River before 1801 were squatters, and it was estimated that in January, 1798, there were 200 such families.¹

Lands Chosen for Settlement

Symmes had planned to sell his lands so as to keep a compact, orderly settlement, but he found it impossible to do so after the Indians ceased to be a menace.² In contrast to the compact settlements made in the Miami Valley before 1794 was the wide dispersal of farms in the years which followed; although in some cases two or more families took up adjoining tracts so that they could enjoy the advantages of companionship and mutual aid, isolated farms became the rule.

¹Bond, op. cit., p. 378.

²Downes, op. cit., p. 65.

Importance of drainage.--The characteristics of the land which the settlers thought most desirable must be largely inferred from the nature of the lands they chose. Those settled by 1800 included a large part of the bottom lands of the Valley and a considerable part of the sloping, eroded stream-trough margins. Some tracts lay on the till plains and the terminal moraines, but those were largely in the rather narrow area between the Miamis where the upland plains were naturally better drained than they were on the broader till plains to the east and west of the rivers.

The northern frontier in 1800 consisted of two prongs extending northward, the one on the west on the Late Wisconsin terminal moraine, and the one on the east on the sloping trough margins and bottom lands of Mad River (Fig. 6). Between them was an unoccupied area of flatter terminal moraine and till plain which under natural conditions was swampy.¹

The broad section of unsettled land in the southeastern part of the Valley lay largely on Illinoian till plain and contained the headwaters of a number of streams. Much of that land was much more poorly drained than were the settled lands on either side of it.²

Spread of settlement in Montgomery County.--Figure 7 is a map of a small area between the Stillwater and Miami rivers along the northern boundary of Montgomery County. The first land in that area was sold in 1802, the last in 1831. The data shown on the map illustrate several characteristics of settlement in the Miami Valley.

The different acreages of tracts sold in the area were partly the result of changing government policy in regard to the sale of public lands. Sales made between 1800 and 1804 were either in whole or half sections. No whole sections were sold in the area mapped but three fractional sections larger than 320 acres were sold, two along the Miami and one on the Stillwater. The law of 1804 made it possible to purchase any of the government lands

¹History of Champaign County, Ohio (Chicago: W. H. Beers and Co., 1881), p. 430; History of Clarke County, Ohio (Chicago: W. H. Beers and Co., 1881), p. 693.

²Earl D. Fowler and T. C. Green, Soil Survey of Brown County, Ohio, U. S. Bureau of Chemistry and Soils, Series 1930, No. 49 (Washington: Government Printing Office, 1936), pp. 3 and 29; History of Warren County, Ohio (Chicago: W. H. Beers and Co., 1882), pp. 685-686.

then offered for sale in quarter sections, and the larger part of the area was sold in 160-acre farms. The Act of February 22, 1817, permitted the sale of certain sections in half-quarter sections. Three such tracts were sold under that law. After the law of July 1, 1820, it became possible to purchase half-quarter sections on any government lands offered for sale. Ten such tracts in the area were sold under that Act.

The dates of sales also illustrate the common tendency for settlement to take place first in the vicinity of the rivers and later to spread back on to the more level till plains. In that area most of the bottom lands and eroded stream-trough margins were sold by 1810. Occupation of the till plain began before 1810, but more than half of it was not occupied until after that date, and two parcels were not purchased until 1831.

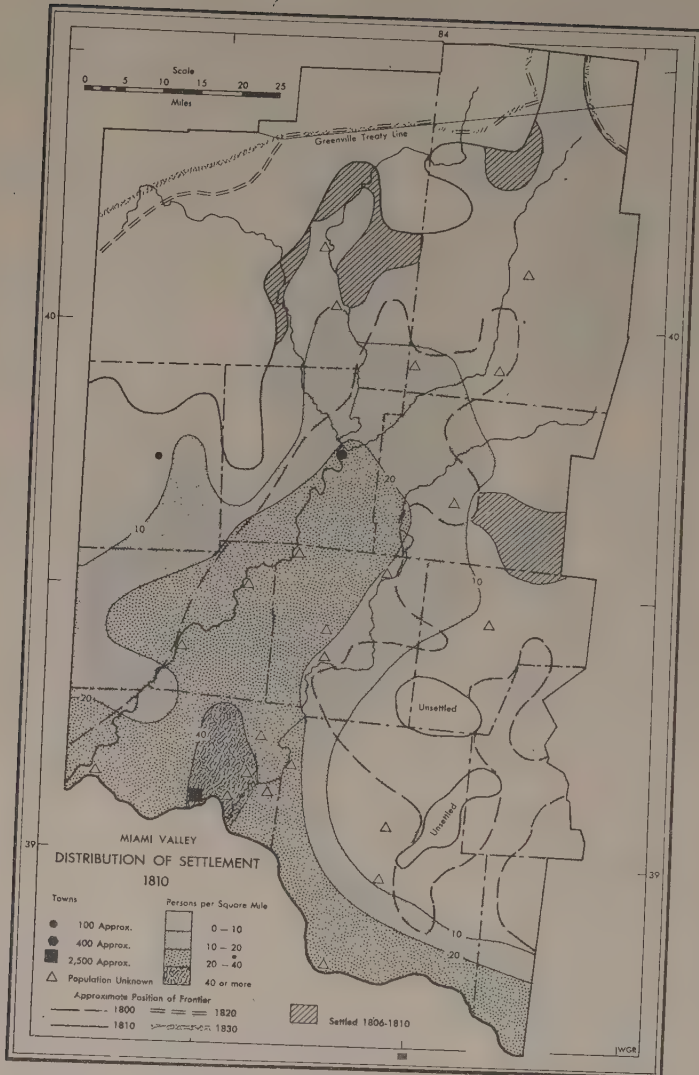
Incipient Towns

Speculators in land did not confine their activities to rural areas, for there was much speculation in lands which dealers hoped would become towns. At least seven, which have survived the years, were laid out between 1795 and 1800. Four of those, namely Reading, Hamilton, Franklin, and Dayton, were in the Mill Creek-Miami River trough; two, Deerfield and Waynesville, were on the banks of the Little Miami; and Williamsburg was on the East Fork of the Little Miami (Fig. 6). In 1800 all of those places were but tiny collections of cabins.

Pioneer Economy

Pioneers in the Valley were at first occupied with clearing and planting small fields and with building log cabins. Living was largely on a subsistence level, as little surplus above actual needs could be produced. Indeed the new community was not at first even able to feed itself and had to draw upon settlements farther up the Ohio River and on those in Kentucky for the additional supplies needed.¹ In time as more land was cleared and farms began to produce more than their owners needed, the early settlers found a market for their surpluses among later arrivals. Indeed during that period and for some years thereafter, the fron-

¹Downes, op. cit., p. 40.



tier settlements lived principally on capital brought into the area from the East and South.

The needs of the pioneers included clothing as well as food, and fields of flax were said to have been almost as common as fields of corn.¹ For the sake of their wool sheep were introduced at an early date. Deerskins were also widely used for clothing, for the early settlers secured a considerable part of their living by hunting.²

The grinding of corn and wheat was one of the problems of early days. Home-made mortars were used, but they were in time replaced by hand- and then by horse-driven mills. By 1800, however, there were several water-power grist mills in the Valley. There were many water-power sites which could be developed, for the amount of water needed was small and the swampy nature of the land at the headwaters of the streams served to regulate the flow of water. Sites on the smaller streams in the hillier lands at the edges of the larger stream-troughs were often used. On the larger streams it was possible in many places to secure a sufficient fall of water by building a ditch across a bend in a stream, providing a fall where the ditch returned the water to the stream at the lower end of the bend.

Spread of Settlement, 1801-1810

The frontier moved forward about as rapidly from 1801 to 1805 as it had in the preceding years, but from 1806 through 1810 the advance was very slow (Fig. 8). During that latter period the settled area broadened rather than lengthened, and by 1810 occupied almost all of the Miami Valley except an area in the northwest and north, and minor unsettled areas in the northeast and southeast.

During the decade 1801 to 1810 the population increased from approximately 15,000 to 78,000. Apparently during the first half of the decade the area of settlement was spreading, and at the same time the older areas were being filled up. During the latter half of the decade the process was largely one of filling

¹W. A. Lloyd, J. I. Falconer, and C. E. Thorne, The Agriculture of Ohio, Bulletin 326 (Wooster: The Ohio Agricultural Experiment Station, 1918), pp. 55-56.

²Isaac Lippincott, A History of Manufacturing in the Ohio Valley to the Year 1860 (New York: The Knickerbocker Press, 1914), p. 91.

in the intervening open spaces.

The slow advance of the frontier after 1805 was partly due to threats of Indian troubles and rumors of a possible war with Great Britain. At least as early as 1807 it was seen that those fears were slowing down immigration.¹ Several seasons of poor crops also occurred at about that time. The depression which lasted through 1808 and a large part of 1809 may also have helped to delay the advance. Settlement was also becoming more difficult due to the swampy nature of much of the untaken land remaining in the Miami Valley; and because as the frontier moved northward, distances from available markets increased, and the use of traces cut through swampy lands became more difficult.

During the decade at least fourteen towns were laid out, commercial agriculture was developed, and there was a very considerable increase in local manufacture. Ohio became a state in 1803 and commenced to clear state roads and to establish a number of new counties.

Frontier in 1810

With the exception of a very few miles, the northern frontier in 1810 crossed the swampy till plains and low moraine belts of the Late Wisconsin glaciation. In places higher, well drained lands existed, but settlers were slow to occupy them because they were difficult of access and because malaria or "ague" was prevalent everywhere.

Nearly all of the land unsettled in 1810, as well as a good deal settled in the preceding decade, had since been artificially drained.² The frontier in that year (Fig. 8) was characterized by a series of curves. In every case where the frontier looped toward the north it marked a forward movement on rolling, better drained land, while each loop toward the south marked an area of flatter, swampy land. Similarly, the two island-like unsettled areas which remained in the southeastern part of the Val-

¹William T. Utter, The Frontier States: 1803-1825, Vol. II of The History of the State of Ohio, ed. Carl Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1942), p. 79.

²U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Agriculture, Drainage of Agricultural Lands (Washington: Government Printing Office, 1942), p. 363.

ley were on poorly drained Illinoian till.

Economic Changes

Throughout the period of 1801-1810 agricultural production could not have been far above the subsistence level. Incoming settlers probably still furnished the chief market for whatever surplus was produced. There was some small surplus available for distant markets, however, and the trade with plantations along the Lower Mississippi and in New Orleans got under way.

Movement by river.--The first flatboat left Dayton loaded with grain, pelts, and venison bound for New Orleans in the spring of 1800.¹ No complete record has been kept of the number which made the trip in succeeding years. Newspaper records of boats leaving Dayton did not begin until 1809 when they reported that one left in May and nine in August of that year.² Some of those boats may have come from farther up the Miami or from the Stillwater, for it became customary for boats from upstream to collect at Dayton and leave there when there was a freshet. Other boats left from points farther downstream.

Flatboats were used on the Miami from a point at least as far north as the mouth of Loramie Creek and perhaps from the portage on that stream. The Stillwater was apparently used from as far north as Covington. The Mad River does not seem to have been used for navigation. Some of the smaller, lower tributaries of the Miami may have been used occasionally. Drake said in 1815, of the Little Miami, "for navigation it is of little consequence,"³ but Drake and Mansfield, writing in 1826, told of an average of thirty boats a year coming down the Little Miami, about one-third as many as on the Miami.⁴

Most of the traffic on the Miami and Loramie Creek, and

¹Edgar, op. cit., p. 54; Crew, op. cit., p. 63.

²A. W. Drury, History of the City of Dayton and Montgomery County, Ohio, Vol. I (Chicago: S. J. Clark Publishing Co., 1909), p. 114.

³Daniel Drake, Natural and Statistical View, or Picture of Cincinnati and the Miami Country (Cincinnati: Looker and Wallace, 1815), p. 35.

⁴Benjamin Drake and E. D. Mansfield, Cincinnati in 1826 (Cincinnati: Morgan, Lodge and Fisher, 1827), p. 78.

all of it on the other streams mentioned, was downstream. Upstream traffic was carried by keel boats, most of which did not go beyond Dayton. While flatboats going downstream could take advantage of high water to get over the bars and riffles, the keel boats had to go when the water was comparatively low and so found many obstructions. The distance from Cincinnati to Dayton by the Ohio and Miami rivers was about 100 miles, by road via Lebanon 49 miles. It is not surprising, therefore, that under those conditions most of the movement up the valley was by pack-horse, or perhaps in the latter part of the period by wagon.

In 1809 two keel boats were put into operation, one from Dayton to the head of navigation on Loramie Creek, the other from the head of navigation on the St. Mary's River to Lake Erie via the Maumee River. A twelve-mile portage separated those two water routes over which a more or less regular schedule was maintained for some years.¹

Opening new roads.--As noted above Ohio achieved statehood in 1803, and the legislature at that time began to appropriate the 3 per cent of the funds received from the sale of public lands, allotted to it by the Federal Government, for the opening of roads. Unfortunately the money was so widely distributed that little improvement was possible on any one. By 1808 there were three state roads by which it was possible to travel from Chillicothe to Cincinnati, the College Lands Road with a branch to Cincinnati, the Anderson State Road opened in 1804 to 1806, and the one by Williamsburg. Two others opened during that period were those from Dayton to Springfield and from Springfield to Columbus.

Opening up the roads consisted in cutting down the trees along a strip forty feet wide. If the amount appropriated for the Anderson State Road, eighteen dollars a mile, was typical, no more could be expected. With the wear of traffic such routes soon became a series of mud holes, and sometimes it was easier to ride in the woods beside the road than to ride on it.² Poor as they were some of them appear to have been heavily travelled.

Growth of manufacturing.--The construction of water-powered grist mills, begun before 1800, was continued during the decade 1801-1810. Construction of saw mills was begun almost as

¹Edgar, op. cit., p. 138. ²Utter, op. cit., pp. 203-205.

early; in fact the two were often built at the same site. Distilleries became more numerous and whiskey was shipped down the river. All of those establishments were small, working only part of the time. For the most part they were preparing local products for the local market, but even before 1810 they were preparing some products for sale in the South.

Distribution of Settlement in 1810

In 1810 the isopleth of twenty persons per square mile reached its northern limit in the vicinity of Dayton, roughly paralleling the Miami River on each side until within ten or twelve miles of the Ohio, thence curving to parallel the Ohio both to the east and west (Fig. 8). At no point was it more than fifteen miles from a navigable stream. Townships more than that distance from the Miami on the east did not gain population so rapidly as those closer to the river on its western side even though they had been settled several years earlier. The very considerable increase in population west of the Miami during that decade was on lands opened for settlement in 1801.

The isopleth of forty persons per square mile surrounding an area to the east and northeast of Cincinnati was nowhere more than twelve miles from the Ohio.

Spread of Settlement Beyond the Miami Valley

During the decade 1811 to 1820 the frontier moved northward until it practically coincided with the Greenville Treaty Line except in the west where about one-third of Darke County remained unsettled (Fig. 8). Most of that northward movement took place in the last six years of the decade. Fear of Indian attack during the War of 1812 not only prevented expansion of settlement but caused some settlers along the frontier of 1810 to abandon their cabins temporarily and move to more densely settled areas until the war was over.¹

Northward movement was even slower during the next decade. The only advance was one of five or six miles in Darke County. The period 1821 to 1830 was not a favorable one for expansion because the Panic of 1819 had been felt very severely in Ohio.

¹E. Frazer Wilson, *History of Darke County, Ohio*, Vol. I (Milford, Ohio: Hobart Publishing Co., 1914), p. 557.

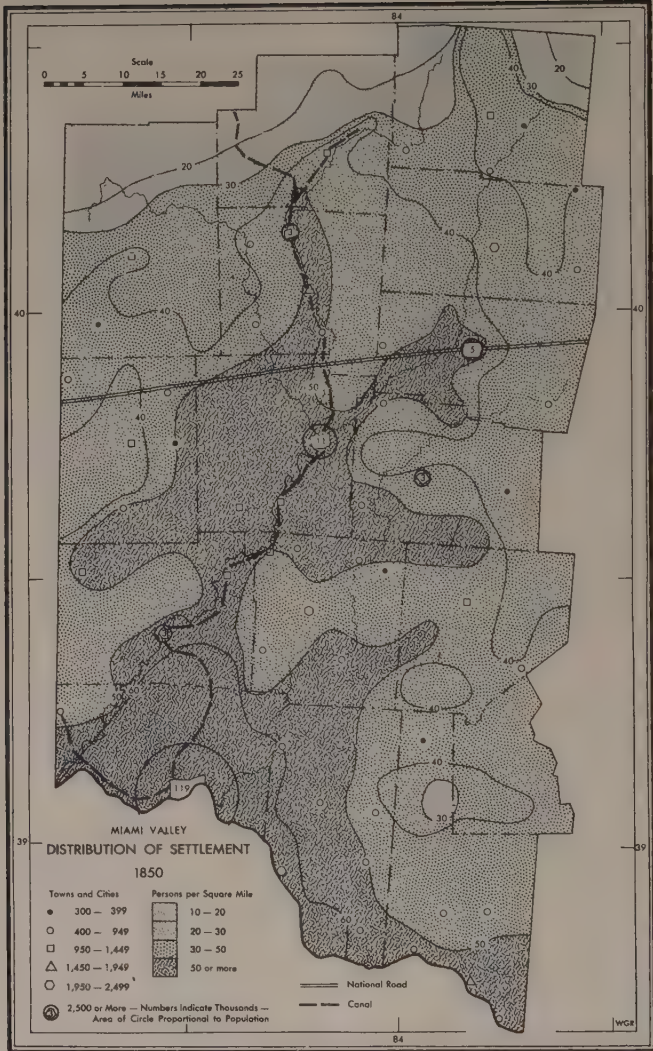


Fig. 9

Prices for farm products were very low, and farmers were unable to make payments on the lands they had purchased on credit. During that time many settlers left Ohio to go farther west. The hard times were not over until 1825.¹

The Federal Government obtained title to lands beyond the Greenville Treaty Line in 1818.² The first of those lands were opened to settlement in 1819, but portions of the Miami Valley lying north of the treaty line were not surveyed until 1832.³ Settlers moved into northern Darke County and the lands north of the treaty line in Shelby and northwestern Logan counties in the early 1830's, and into the previously unoccupied northeastern corner of Logan County in 1839, though it was many years before the greater part of the wet land was brought under cultivation. After 1839 the frontier passed beyond the limits of the Miami Valley.

Growth of Rural Population

The rural population of the Miami Valley grew from 75,000 in 1810 to 370,000 in 1850. Throughout the forty-year period the major features in the distribution pattern shown on the map for 1810 (Fig. 8) continued in evidence. The greatest density was found between the Miami River on the west and the Little Miami and Mad rivers on the east (Fig. 9). That major feature may be likened to a ridge, highest at its southern end near Cincinnati and sloping downward toward the north and also toward both the east and west. As the years passed the height of the ridge increased and it lengthened and broadened. Also its flanks became more irregular.

In 1810 densities at the southern crest of the ridge were about fifty persons per square mile; by 1850 they were one hundred or more in restricted areas. In 1810 at the northern end of the ridge in southern Miami County there were ten persons per square mile; by 1850 the northern end of the ridge extended into Shelby County where there were more than forty persons per square mile. In 1810 densities on the flanks of the ridge were from zero to twenty, by 1850 from twenty-five to fifty, and in a fringe

¹Utter, op. cit., pp. 290-295.

²Sherman, op. cit., p. 123.

³Ibid., p. 139.

along the northern border of the valley ten to twenty persons per square mile.

The growth of population during those forty years was the result of many causes. Factors which permitted the area to support a much greater population in 1850 than in 1810 were the use of steamboats on the Ohio and Mississippi rivers, improved roads, the construction of canals, an increase in the production of crops and farm animals, an increase in rural manufacturing in mills and handicraft industries, and an increase in wholesale and retail trade. There was also an increase in professional and other services.

Transportation by River

Flatboats continued to be used on the Miami River until the opening of the Miami Canal from Cincinnati to Dayton in 1829, and they were used from Dayton northward until the opening of the canal to Piqua in 1837. Keel boats were in use until about 1820. By that time the number of mill- and fish-dams built in the rivers made it difficult for keel boats to operate. Flatboats could still be used because they went downstream in time of flood and so usually succeeded in getting over the dams. More than thirty flatboats, some of them from farther upstream, left Dayton on March 24, 1825, for example, but the movement was a very irregular one.¹

The first steamboat went down the Ohio in 1811 but it was not until 1818 that steam navigation became important.² The construction in 1828 of the canal around the falls at Louisville was a further improvement in the connection with the South. Twenty-one river steamers arrived at and departed from Cincinnati in one week in 1827.³ The use of steam navigation somewhat regularized the flow of goods down the river. When the movement was by flatboats only, the tendency to start in time of flood led to great numbers of cargoes arriving at New Orleans at one time, thus glutting the markets and forcing prices to a very low level. The more regular movement of steamboats throughout most of the year

¹Edgar, op. cit., p. 197.

²Lippincott, op. cit., pp. 59-60.

³Drake and Mansfield, op. cit., p. 75.

made it possible to avoid congestion.¹

Development of Roads

The traces and trails of the early pioneer days were gradually widened into wagon roads, and bridges were built on them. Some significant improvement of the roads was made by the Army during the War of 1812.² In spite of the prevalence of gravel deposits in nearly every township in the Valley, little use was made of gravel in road building until the 1840's. The mud roads, poor as they were, were an improvement over the traces. About 1800 the rate on goods brought by pack-horse from Cincinnati to Dayton was \$2.50 per hundred pounds. By 1812, the rate on goods brought by wagon was \$1.00 per hundred.³ The first stage coach line from Cincinnati to Dayton was opened in 1818 and by 1822 a line was in operation from Dayton to Springfield and Columbus.⁴

Although projected much earlier, the construction of turnpikes, which were either gravel or macadam, did not get underway until 1836. A Cincinnati-Dayton turnpike was completed in 1841.⁵ The building of turnpikes went on very rapidly during the 1840's, and Cist reports 514 miles of macadamized roads focusing on Cincinnati in 1851.⁶

The National Road giving connection with the East was completed through the Miami Valley in the late 1830's and soon after was extended into Indiana. The effect of the Road on settlement in the Miami Valley seems to have been principally in the east central part in Clark and adjacent parts of Champaign and Greene counties. Springfield, on the Road itself, particularly demonstrated its value by very rapid growth. Farther west in the Valley the effect was less pronounced for in that area the already built Miami Canal gave better access to markets.

From about 1830 to 1835, or later, farm produce went north-

¹Lippincott, op. cit., p. 58. ²Crew, op. cit., p. 89.

³Ibid., pp. 65, 95. ⁴Edgar, op. cit., pp. 191-192.

⁵Charles Cist, Cincinnati in 1841: Early Annals and Future Prospects (Cincinnati: n.p., 1841), p. 82.

⁶Charles Cist, Sketches and Statistics of Cincinnati in 1851 (Cincinnati: Wm. H. Moore and Co., 1851), p. 131.

ward by wagon from northern Champaign and Logan counties to Sandusky. Farmers often formed groups and took wagon loads of grain over the road from Urbana and Bellefontaine to Lake Erie, a corduroy road, as late as 1842.¹

Building and Use of Canals

The Miami Canal was opened for use from Cincinnati to Dayton in 1829. The Canal utilized the lowland route from Cincinnati through the Mill Creek Valley to the Miami trough, which it followed to Dayton (Fig. 9). The total length of that part of the Canal was sixty-six miles, forty-four miles shorter than the river route. Work on a northward extension was started in 1833, and the Canal was opened to Piqua in 1837. The further extension of the Canal to Lake Erie by way of Loramie Creek and the portage to the St. Mary's River was opened to traffic in 1845 and thereafter it was known as the Miami and Erie Canal. In order to supply water for the higher portions of the Canal, three reservoirs, two of them in the Miami Valley, were constructed. One of those was Indian Lake in Logan County, the other Loramie Reservoir in Shelby County.

There were two branches of the Miami and Erie Canal in the Valley. One, the Sidney Feeder, tapping the Miami River five miles above Sidney, brought water and carried goods to the main Canal near the mouth of Loramie Creek. Another branch, following a pre-glacial stream trough, connected Lebanon with the main Canal just south of Middletown. That branch was not completed until 1840 and went out of use in the 1850's.

The opening of the Canal caused a greater movement of goods southward to Cincinnati than had been the case when river flatboats were in use. Dayton became a center for wagon trains which brought goods from Miami, Clark, Champaign, and Greene counties and even from as far away as Ft. Wayne, Indiana.² Receipt of goods by Canal at Cincinnati near the time of its opening and near the close of the period is shown in Table 2.

¹Francis P. Weisenburger, *The Passing of the Frontier: 1825-1850*, Vol. III of *The History of the State of Ohio*, ed. Carl Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1941), p. 25.

²Crew, *op. cit.*, pp. 155, 199.

TABLE 2
FREIGHT RECEIPTS AT CINCINNATI
VIA MIAMI AND ERIE CANAL

Commodity	Three-Year Average 1833-35	Three-Year Average 1848-50
Wheat, thousands of bu.	0	42
Corn, " "	13	382
Flour, thousands of bbls.	103	103
Pork, " "	21	20
Whiskey, " "	52	65

Source: C. C. Huntington and C. P. McClelland, History of Ohio Canals (Columbus: Ohio State Archaeological and Historical Society, 1905), p. 177.

Very considerable quantities of wood products travelled on the Canal. By 1846 and 1847 there was a deficiency of lumber in the central part of the Valley, and lumber was moving in by Canal from both north and south.¹ Clearances of merchandise from Cincinnati varied from 3,000,000 to 8,000,000 pounds between 1833 and 1850.

Development of Agriculture

Two trends in agriculture were evident during the period 1810-1850. First, an increase in the acreage of crop land, and second, a change from subsistence agriculture of pioneer times toward what is now termed Corn Belt agriculture. No data on crop acreages are available for that period and we have data on crop yields for only two years, that given in the Census of 1840 and 1850. Obviously it is dangerous to draw conclusions of trends from crop yields of two years, nevertheless, the differences between the yields of the more important crops are great enough to warrant some inferences. The corn crop in 1840 was about three times the wheat yield of that year; in 1850 it was six times as great. That indicates that corn was the dominant crop in both

¹Annual Report of the Commissioner of Patents for the Year 1847, U. S. Congress, House of Representatives, 30th Cong., 1st Sess., House Executive Document 54 (Washington: Wendell and Van Benthuyssen, 1848), pp. 600-604.

years, and that the acreage was increasing more rapidly than that of wheat. There was little change in the yield of either wheat or oats, which were produced in about equal quantities in the two years. Those three grains accounted for more than nine-tenths of all the grain crops.

Figures showing the arrivals of farm products at Cincinnati by the Canal (Table 2) show some increase in shipments of corn, wheat, and whiskey in the late 1840's as compared to the early 1830's and no significant change in shipments of flour and pork. Those figures do not show a significant change which had taken place in agriculture. During the period Cincinnati became the greatest pork packing center of the country, and hogs were driven to the city from a wide area around it. The number of hogs "put up" in Cincinnati in 1833 was 85,000; by 1847 the number was 250,000.¹ Not all of those hogs came from the Miami Valley but it was their principal source. Miami Valley farmers had discovered that their most productive crop was corn, and that the best way of marketing the corn was by feeding it to hogs. The hogs ran in the woods until within five or six weeks of killing time and were then fattened on the corn.²

A good deal of corn was made into whiskey also, but the corn used in making all the whiskey which was assembled in the Cincinnati market did not involve more than 3 per cent of that grown in the area which furnished the whiskey.³ Corn was also shipped down the Ohio River in large quantities at that time,⁴ but, judging from the receipts of corn at Cincinnati by canal, that could not have been a large factor in the disposal of the Miami Valley crop. It may have been more important from the Ohio River counties than from the central and northern part of the Valley.

Feeding of cattle for sale in eastern markets does not seem to have been nearly so important in the Miami Valley as it

¹Annual Report of the Commissioner of Patents for the Year 1848, U. S. Congress, House of Representatives, 30th Cong., 2d Sess., House Executive Document 59 (Washington: Wendell and Van Benthuysen, 1849), p. 525.

²Annual Report of the Commissioner of Patents for the Year 1847, op. cit., p. 526.

³Annual Report of the Commissioner of Patents for the Year 1848, op. cit., p. 645.

⁴Weisenberger, op. cit., p. 60.

was farther east in Ohio, nor does dairying seem to have been of much more than local significance before 1850. Partly for that reason hay was not a very important crop and clover was grown but little, and the rotation system which has characterized the agriculture in more recent years was not widely used. The leading position of corn, wheat, and oats among the crops, and the practice of feeding much of the grain to animals had become firmly established.

In the more newly settled northern part of the Valley farming had not made so much progress by 1850 as it had in the southern and central parts. Canal receipts in the Piqua district for 1847-48 show relatively large clearances of lumber, barrel staves and hoops, hoop poles, barrels, pot and pearl ash, and saleratus,¹ indicating that farmers in the north were still clearing land in considerable quantity. Corn and oat crops in 1840 and 1850 in the three northern counties were considerably smaller than those of counties farther south. The per acre value of land and improvements in the northern counties in 1850 ranged from ten dollars in Darke County to sixteen in Logan County. In the other counties of the Valley the values were from twenty to eighty-three dollars per acre.²

Rural Manufacturing

The growing population created a considerable market for manufactured goods. Costs of manufactured goods brought from the East were high due to high transportation costs. Since a great deal of the manufacturing of that day, even in the industrial districts, was handicraft or done in small factories, it was practical for manufacture to become established near the frontier. Local markets were small but so were production units.

Census data on manufacturing were collected for 1820, 1840, and 1850. Data for the first two of those censuses are regarded as incomplete and unreliable³ while data for 1850 were

¹Annual Report of the Commissioner of Patents for the Year 1847, op. cit., pp. 600-604.

²Lloyd, Falconer, and Thorne, op. cit., pp. 209-210.

³Carrol D. Wright and William C. Hunt, The History and Growth of the United States Census, U. S. Congress, Senate, 56th Cong., 1st Sess., Senate Document No. 194 (Washington: Government Printing Office, 1900), pp. 38-39.

published only by state totals. Incomplete as the census data are they support the evidence found in other contemporary records and in local histories that manufacturing was widespread throughout the rural areas. By 1833 grist mills and saw mills were widely scattered throughout the Valley. Less common but not infrequently found were tanneries, wagon shops, carding and fulling, oil, and paper mills. Distilleries were very common.¹ Most of those establishments were very small and many were probably operated in conjunction with farming.

The nature of the economy of a rural hamlet with its handicraft industries in 1833 is illustrated by the situation in Clarkesville in Clinton County. Kilbourn's Gazetteer states:

It contains twenty-eight dwelling houses, two meeting houses, and two school houses; three tanners, one tailor, three blacksmiths, one carpenter, three taverns, four stores, four wagon makers, one cabinet maker, one physician, one hatter, two shoemakers, three coopers, two bricklayers, and one stone mason. The number of inhabitants is computed at about 150.²

Growth of Towns and Cities

During the years from 1810 to 1850 a number of Miami Valley towns made rapid growth. With the exception of suburbs of Cincinnati and Dayton, and of Tippecanoe City, all of the centers in the Valley classified as urban in 1940 had populations of more than 1,000 by 1850. During the period the greatest rate of growth was made by Cincinnati while four other Valley cities, Dayton, Springfield, Hamilton, and Piqua also made rapid progress. Those rates of growth are shown in Table 3.

Growth of Urban Labor Supply

In the earlier years labor for manufacturing was scarce and wages high due to the relative ease of securing farm land. Drake, in 1815, pointed out that Cincinnati up to that time had had no surplus laboring population because farm land was available, and he gave that as one reason why manufacturing had not made greater progress in the city.³ The scarcity of labor and relatively high wages continued until about 1830 by which time suffi-

¹J. Kilbourn, Ohio Gazetteer or Topographical Dictionary (11th ed.; Columbus: J. Kilbourn, 1833), pp. 143-467.

²Ibid., p. 139.

³Drake, op. cit., p. 142.

TABLE 3

RATE OF GROWTH OF POPULATION, MIAMI VALLEY
AND CITIES, 1810-50

Area or City	Decade			
	1810-20 Per Cent	1820-30 Per Cent	1830-40 Per Cent	1840-50 Per Cent
Miami Valley...	136	44	36	41
Cincinnati.....	280	157	87	149
Dayton.....	161	195	106	81
Springfield....	...	...	91	148
Hamilton.....	...	63	31	128

Sources: U. S. Census Office, Third Census of the United States; 1810 (Washington: U. S. Census Office, 1811), pp. 57a-68a; U. S. Census Office, Fourth Census of the United States; 1820 (Washington: Gales and Seaton, 1821), pp. 32-36; U. S. Census Office, Fifth Census of the United States; 1830 (Washington: D. Green, 1832), pp. 118-141; U. S. Census Office, Sixth Census of the United States; 1840 (Washington: Blair and Rives, 1841), pp. 292-337; U. S. Census Office, Seventh Census of the United States; 1850 (Washington: R. Armstrong, 1853), pp. 821-849.

cient labor was available for manufacturing, and wages began to conform to those of eastern communities.¹ From 1830 to 1850 there was a constant increase in the supply of labor though at times there was a shortage of skilled workers in some trades.

One important source of labor was the German immigrants who began to come into the state about 1825. By 1840 Germans made up 23 per cent of the population of Cincinnati, by 1850, 27 per cent.² Nor were they confined to Cincinnati, for 10 per cent of the population of Dayton in 1850 was German³ and some were also found in other river towns such as Miamisburg and Hamilton. A considerable number of Irish came into the state to work on the canals and then settled in the cities. Cist states that in 1841 nearly one-half of the adult males in Cincinnati were of foreign birth, mainly from Germany and Great Britain.⁴ Large numbers of

¹Lippincott, op. cit., p. 73.

²Weisenberger, op. cit., p. 52. ³Drury, op. cit., p. 500.

⁴Cist, Cincinnati in 1841, op. cit., pp. 38-39.

those immigrants settled in the cities, and, since many of them were skilled in various manufacturing and building trades, they formed an important addition to the labor supply.

Towns on the Till Plains

There were eight towns on the till plains which had from 1,000 to 3,000 inhabitants in 1850. They were Xenia, Lebanon, Urbana, Eaton, Wilmington, Bellefontaine, Oxford, and Greenville. With the exception of Oxford, a rural trading point and educational center, all of those places were county seat towns. They were all laid out before 1820 and were at the junctions of roads in existence at that time. In addition to being local trading centers they were, throughout the period, small manufacturing centers.

Miami and Mad River Towns

The towns along the Miami River from Sidney on the north to Hamilton on the south had the advantages of water-power for manufacturing, and all had the benefit of the Miami Canal during part of the period. Springfield on Buck Creek, a tributary of Mad River, had water-power but no canal. In that group were Dayton, Springfield, and Hamilton, aside from Cincinnati, the largest three towns in the valley. Dayton by that time had reached a population of 11,000 and Springfield and Hamilton had about 5,000 inhabitants each. Franklin, Middletown, and Miamisburg, between Hamilton and Dayton, had populations of about 1,000 each. Troy, Piqua, and Sidney, all north of Dayton, were somewhat larger.

Small water-power developments in those towns began rather early. The first ditch bringing water to a mill in Dayton was dug in 1812. A dam was built across the Miami River with a mill race to Miamisburg, probably in 1807.¹ A water-power mill was built at Springfield at about the same time. The amount of power developed in those earlier attempts was not much if any greater than at similar developments on much smaller streams in other parts of the Valley, though those on the river probably had a more constant source of power. In the earlier years of the period

¹Dwight Porter, "Report on the Water Power of the Ohio River Basin and the Ohio State Canals," Tenth Census of the United States: 1880, Vol. XVII (Washington: Government Printing Office, 1886), p. 483.

those mills in the riverside towns milled primarily for local use. The factories in Dayton in 1833 included:

2 cotton mills	1 silk mill
3 grist mills	2 lath factories
1 fulling and carding mill	1 shingle sawmill
2 saw mills	1 woodenware factory
1 oil mill	1 textile machinery factory ¹

For the most part those were the same kinds of mills and served the same functions as mills in the hamlets. The cotton and silk mills, and more particularly the factory for making textile machinery, were not the common thing and perhaps gave a hint of the industrial city to come.

The beginnings of industrial leadership in the river towns came in the 1830's and 1840's when much larger resources of power were developed. One such source was along the Miami Canal. Power was available where locks occurred, usually where the canal dropped from one terrace level to another. One or more mills could take water from above the lock and return it to the canal below the lock. Such a development was the Cooper Hydraulic in Dayton built in 1838, which eventually supplied the water for seven factories.

Another type of water-power development was the larger hydraulic canal, an enlargement and improvement over the small ditches dug by the earlier millwrights. One such canal was built in Dayton in 1845. One was opened on the east side of the river at Hamilton in 1845, and construction of another on the west side of the river started in 1849.

Utilization of water-power involved not only a growth in the manufacture of local farm products--Dayton milled 160,000 bushels of wheat and pressed 320,000 gallons of linseed oil a year by 1850--but also in the manufacture of raw materials brought from more distant sources and for distant markets. At least two paper mills were in operation in Dayton and two in Hamilton by 1850. Machine shops making agricultural machinery, paper and textile mill machinery were also established before 1850.

The data for 1840 given in Table 4 give the best available idea of occupations in the Miami River towns, though the wide fluctuations in the percentage of total population accounted for suggest that the data on occupations are not complete. That is the only year during the period for which figures are available.

¹Kilbourn, op. cit., p. 174.

TABLE 4

POPULATION AND NUMBER OF OCCUPIED PERSONS,
MIAMI VALLEY TOWNS, 1840

	Dayton	Springfield	Piqua	Hamilton	Troy	Middletown	Sidney
Population...	6,067	2,062	1,481	1,409	1,351	809	713
Persons occupied.....	1,107	373	391	416	263	218	144
Per cent occupied...	18	18	26	29	19	27	20
Persons occupied in:							
Manufacturing and trade..	810	251	264	253	191	127	74
Commerce.....	149	66	54	34	34	27	26
Learned professions	75	38	21	33	22	10	16
Navigation...	52	1	0	11	14	6	0
Agriculture..	21	17	52	85	2	48	28

Source: U. S. Census Office, Sixth Census of the United States: 1840 (Washington: Blair and Rives, 1841), pp. 290-337.

Ohio River Towns

Two towns on the Ohio River above Cincinnati were of some importance by 1850. Ripley with a population of 1,780 and New Richmond with an estimated population of 2,000¹ were larger than in 1940. Both towns were collecting and shipping points for that part of the Miami Valley east of the Miamis which drains directly into the Ohio River.

By 1833 Ripley was building steamboats, making machinery, and packing pork to sell in the South. A steam woolen mill was also in existence. Before 1850 seventeen steamboats had been built in the two yards there, and much repair work on river boats was done. In the 1840's ten to fifteen flatboats would leave Ripley in a year, each with 1,000 or more barrels of pork.² New

¹New Richmond was not returned separately in the Census of 1850.

²James Hall, Statistics of the West (Cincinnati: J. A.

Richmond was a smaller boat-building center and became an important distilling point after 1835.¹

Cincinnati

In 1850 Cincinnati, including its incorporated suburb of Eastern Liberties, had a population of 119,000. It was the largest northern city west of the Appalachians, and had been since 1820. The city was a part of the Miami Valley, whose stream of settlers had given it its start, and it was now a city of importance throughout the Mississippi Valley. It began its growth as a commercial center; manufacturing followed.

Growth of commerce.--Shipment of produce down the Ohio and Mississippi rivers to New Orleans beginning in 1782 antedated settlement of the Miami Valley.² The way was thus marked out for shipment from Cincinnati as soon as goods were available for trade. By 1815, Daniel Drake could report:

Of these exports, flour is the chief article, and several thousand barrels are annually exported from the Miami Country to New Orleans. After this follow pork, bacon, and lard; whiskey and peach brandy, beer and porter; pot and pearl ash, cheese, soap and candles; hemp and spun yarn; walnut, cherry, and blue ash boards; cabinet furniture and chairs.³

This list is worth repeating because many of those products figured in the down-river trade for half a century or more.

At that time goods brought to Cincinnati came chiefly from Philadelphia and Baltimore by pack-horse or wagon to the Upper Ohio, and then to Cincinnati by boat. Expensive as transportation by that route was, it was cheaper than the long passage upstream from New Orleans.

By 1826 the number employed in trade and mercantile pursuits was estimated at 800 (Table 5) or about one-fifth of the workers in the city, with another 500 persons estimated as engaged in navigation. No attempt was made by the writers in that period

James and Co., 1836), pp. 252-263; History of Brown County, Ohio (Chicago: W. H. Beers and Co., 1883), pp. 429-430.

¹History of Clermont County, Ohio, op. cit., p. 412.

²Archer B. Hulbert, Historic Highways of America, Vol. IX (16 vols.; Cleveland: A. H. Clark Co., 1903), p. 124.

³Drake, op. cit., p. 148.

TABLE 5
POPULATION AND OCCUPIED PERSONS,
CINCINNATI, 1795-1850

Year	Population	Occupation	Number
1795 ^a	500		
1800 ^a	750		
1810 ^b	2,540		
1815 ^c	6,000		
1820 ^d	9,642	Manufacturing.....	597
1826 ^e	16,230	Manufacturing.....	3,000
		Trade and mercantile.....	800
		Navigation.....	500
		Learned professions.....	97
		Total.....	4,397
1830 ^f	25,920 ^j		
1840 ^g	47,844 ^j	Manufacturing and trade.....	10,287
		Commerce.....	2,044
		Navigation.....	1,756
		Learned professions.....	377
		Agriculture.....	80
		Total.....	14,544
1841 ^a	.....	Manufacturing and mechanic arts	10,866
		Commerce and navigation.....	2,226
		Learned professions.....	434
		Miscellaneous.....	1,025
		Total.....	14,551

TABLE 5--Continued

Year	Population	Occupation	Number
1850 ⁿ 1851 ⁱ	118,659 ^j	Manufacturing and mechanic arts Commerce and navigation..... Learned professions..... Miscellaneous..... Total.....	24,895 6,154 1,006 3,177 35,232

^aCharles Cist, Cincinnati in 1841 (Cincinnati: n.p., 1841), pp. 38-43.

^bU. S. Census Office, Third Census of the United States: 1810 (Washington: U. S. Census Office, 1811), p. 62.

^cDaniel Drake, Natural and Statistical View, or Picture of Cincinnati and the Miami Country (Cincinnati: Looker and Wallace, 1815), p. 170.

^dU. S. Census Office, Fourth Census of the United States: 1820 (Washington: Gales and Seaton, 1921), p. 35.

^eBenjamin Drake and E. D. Mansfield, Cincinnati in 1826 (Cincinnati: Morgan, Lodge, and Fisher, 1827), p. 57.

^fU. S. Census Office, Fifth Census of the United States: 1830 (Washington: D. Green, 1832), p. 126.

^gU. S. Census Office, Sixth Census of the United States: 1840 (Washington: Blair and Rives, 1841), p. 307.

^hU. S. Census Office, Seventh Census of the United States: 1850 (Washington: R. Armstrong, 1853), p. 830.

ⁱCharles Cist, Sketches and Statistics of Cincinnati in 1851 (Cincinnati: Wm. H. Moore and Co., 1851), pp. 49-51.

^jIncludes the suburb of Eastern Liberties adjacent to Cincinnati.

to separate local retail trade from wholesale trade. Indeed, the two forms of trade were not separate at that time.

Cincinnati was the shipping point for goods from nearly all of the Miami country and from the Whitewater Valley of eastern Indiana. It "imported," to use the common expression of the writers of the period, goods for that part of the Ohio west of the Muskingum, nearly all of Indiana, and large portions of Kentucky and Missouri.¹ Dry goods and lighter manufactured articles were brought over the mountains to Pittsburgh and Wheeling and so down the Ohio. Sugar, cotton, coffee, tea, and pottery were brought up the river from New Orleans. Pine lumber was rafted down the Allegheny and Ohio rivers from western New York and Pennsylvania. Salt from Pennsylvania and Virginia, and iron from Pittsburgh, eastern Ohio, and Kentucky came down the river by boat. Mines in Missouri furnished lead.

The principal "exports" at that time were the products of the farms. Pork products headed the list in 1826, followed in value by flour and whiskey. Much farther down the list were some manufactured goods, including furniture, candles and soap, type and printing materials, and beer and porter, a list which indicates the trend of manufacturing in Cincinnati. Those products went not only to parts of the Ohio Valley and to the "coasts" of the lower Mississippi and New Orleans, but some of them also to the Atlantic Coast cities, the West Indies, and northern South America.²

The expansion of trade at Cincinnati was made possible by the rapid growth of steamboat navigation on the rivers.³ Steamboat arrivals at Cincinnati in 1835 numbered 2,237, and the value of the "exports" was estimated by Benjamin Drake at \$1,000,000 in 1826, \$4,000,000 in 1832, and \$6,000,000 in 1835.⁴

By 1840 the number of persons in Cincinnati who were occupied with commerce and navigation had risen to 3,800, and the trade area of the city was expanding as navigation of the western rivers reached out farther westward and northward. In January of

¹ Drake and Mansfield, op. cit., p. 71.

² Ibid., pp. 76-77.

³ Hall, op. cit., p. 247; Hurlburt, op. cit., pp. 121-123.

⁴ Hall, op. cit., p. 270.

1841 there were 88 steamboats registered in the district of Cincinnati, and 437 in use on the western rivers.¹

In 1851 there were more than 6,000 persons in Cincinnati engaged in commerce and navigation (Table 5). Figures showing the value of products handled in the city at that time are lacking and the figures showing quantities in different units make comparison difficult. Pork products still headed the list, followed by flour and whiskey. In addition to a great variety of other agricultural products, Cincinnati was shipping large quantities of metal articles to the south and southwest. More highly fabricated articles included steam engines, cotton gins, and sugar mills. Builders' hardware, and iron and steel castings were also shipped. Textile products included ready-made clothing and bagging for baling cotton. Furniture was also an important item.²

Growth of manufacturing.--The development of manufacturing in Cincinnati as elsewhere in the West was at first hindered by "the inexperience of the business men, the lack of labor and capital, and the prospect of quicker returns in other departments of industry, notably in commerce."³ The beginning of manufacture described by Drake in 1815,⁴ which involved metalworking, wood-working, and cotton textile manufacture, was severely checked by the hard times of 1819 and succeeding years, but recovery began in 1822.⁵ By 1826 the lines of manufacture which were to continue to be important through 1850 had already been established.

Since the data given by the census of manufactures before 1850 are incomplete and of little value, and those of 1850 were published only as state totals, it is necessary to fall back on contemporary accounts. Rather complete numerical data describing conditions in manufacturing are available for the years 1826, 1841, and 1851. The figures dealing with employment are summarized in Table 6.

Manufacture of articles of metal, wood, cloth, and the preparation of foods employed the greatest number of workers

¹Cist, Cincinnati in 1841, op. cit., pp. 49, 150-151.

²Cist, Cincinnati in 1851, op. cit., pp. 192-193.

³Lippincott, op. cit., p. 69.

⁴Drake, op. cit., pp. 142-147.

⁵Lippincott, op. cit., p. 79.

TABLE 6

PERCENTAGE DISTRIBUTION OF WORKERS IN MANUFACTURING
INDUSTRIES, CINCINNATI, 1826, 1841, 1851

Type of Manufacturing	Distribution of Factory Workers		
	1826 Per Cent	1841 Per Cent	1851 Per Cent
Clothing.....	30	16	15
Articles of metal.....	18	19	24
Articles of leather.....	16	10	10
Articles of wood.....	16	17	8
Clay and stone products.	9	3	3
Printing and publishing.	3	5	4
Soap and candles.....	2	1	3
Paper and paper products	2	1	1
Liquors and beer.....	1	1	3
Foods.....	1	18	20
Miscellaneous articles..	2	9	9
Total.....	100	100	100

Sources: Benjamin Drake and E. B. Mansfield, Cincinnati in 1826 (Cincinnati: Morgan, Lodge, and Fisher, 1827), pp. 64-66; Charles Cist, Cincinnati in 1841 (Cincinnati: n. p., 1841), pp. 54-58; Charles Cist, Sketches and Statistics of Cincinnati in 1851 (Cincinnati: Wm. H. Moore and Co., 1851), pp. 258-261.

throughout the latter part of the period covered by Table 6. Metalworking employed more persons than did any other group. If, however, we combine those groups which prepared Ohio Valley agricultural products for sale--foods, soap and candles, leather goods, and whiskey and beer--we find that they make the most important source of employment.

The larger part of the workers engaged in food production was employed in slaughtering and meat packing, mainly of pork. Baking of hard biscuits for use at sea and for export to the tropics was another phase of good preparation. Distilling and brewing, while from the point of view of value of output were among the most important in the city, employed relatively few workers. Among the leatherworking industries, on the other hand, the number of workers was relatively large, boot and shoe manufacture alone employing nearly 1,800 in 1851.

The most important of the metalworking industries were the

foundries and machine shops, and machine building started early. One hundred steam engines, 240 cotton gins, and "upward of twenty sugar mills" were built in Cincinnati in 1835. By 1850 some 4,700 workers were employed in forty-four shops making machinery. Building of steamboats created one market for steam engines; 164 steamboats were built in Cincinnati from 1816 through 1835.¹

Furniture manufacturers employed more workers than did any other industry making wood products. Various local woods, particularly poplar and walnut, were used. The manufacture of cooperage items was a considerable one, partly due to the demand for barrels on the part of the meat packing, distilling, and brewing industries.

The manufacture of textile goods never made much progress in Cincinnati though it was one of the earliest industries in the city. The manufacture of men's clothing, however, attained large proportions. To the 950 hands employed in the ready-made clothing shops in 1851 should be added more than 9,000 women who did full- or part-time work in their homes. Custom tailoring employed an additional 816 men.²

Power for manufacturing was derived chiefly from steam engines. There were fifteen of them in use by 1826 and fifty by 1835.³ Coal brought down the Ohio in flatboats and barges was used by manufacturers as early as 1815. The consumption of coal in Cincinnati amounted to nearly 2,000,000 bushels in 1840 and 8,000,000 in 1850. Coal had been used only as a source of power in factories as late as 1826, but by 1850 it was used for domestic fuel as well.

Ten locks with a total fall of 111 feet between the level of the Miami and Erie Canal in the upper part of the city and the low-water level of the river furnished some water-power for Cincinnati. At least five mills, three of them grinding flour, were using some of that power in 1836.⁴

¹Hall, op. cit., p. 263.

²Cist, Cincinnati in 1851, op. cit., pp. 184, 242.

³Hall, op. cit., p. 269.

⁴The Cincinnati Directory for the Years 1836-37 (Cincinnati: J. H. Woodruff, 1836), p. 220.

End of Pioneer Days

The year 1850 is an appropriate one to mark the end of pioneer days in the Miami Valley. By that year 78 per cent of the land was held in farms, the major features of the road pattern of today had been laid out, the canal system had reached its maximum extent, and the era of commercial agriculture was well started. By 1850 all of the counties had been set up essentially in their present form, as had almost all the townships. With the exception of the suburbs of Cincinnati and Dayton all of the towns which were to become of more than local significance by 1940 had begun their growth and already demonstrated their leadership.

The year 1850 marked the end of very rapid growth in the population of the Valley. Before that time the increase in population each decade was never less than 35 per cent, in subsequent decades it was never more than 20 per cent. By 1850 the rate of growth of the cities exceeded that of the rural area, a trend which led to the dominance of urban interest in the Valley.

CHAPTER III

PERIOD OF INDUSTRIAL AND AGRICULTURAL DEVELOPMENT

From 1850 to 1900 the population of the Miami Valley increased from 512,000 to 997,000, or 95 per cent, a much slower rate of growth than that of previous decades. Most of the addition was in towns and cities, for the increase in urban population during those years was 299 per cent, while the rural population advanced only 15 per cent. The rural population grew in only two of the decades while the urban population showed an increase in every decade and by 1890 exceeded the rural. In the first half of the century growth had been more rapid in the Miami Valley than in the United States as a whole; in the second half it was much slower than the national rate. Rural population in the United States from 1850 to 1900 grew ten times as rapidly as in the Miami Valley, and urban population more than twice as rapidly. By 1850 the shifting frontier was far to the west of the Miami Valley, and in the five decades which followed the Valley ceased to be a part of the West and became a part of the industrial Northeast.

At some time during the years from 1850 to 1900 the population of a majority of the rural townships reached its maximum and began to decline. The increase in rural population occurred mainly in the northern part of the valley, the last part to be settled, where previously poor drainage and inadequate transportation facilities had been hindrances to settlement. Agriculture reached its peak in areal extent by 1900, and by that time had adopted the major characteristics of a modified Corn Belt economy involving crop rotation, the use of a large amount of machinery, and great emphasis on animal production.

During the period of development an important trend appeared in the population history of towns and villages. Some of them ceased rapid growth or actually declined in population, while another group continued to grow rapidly. Urban growth was associated with increasing concentration of manufacturing in those places where it has continued to the present time.

Drawing a balance of the changes in numbers of people in

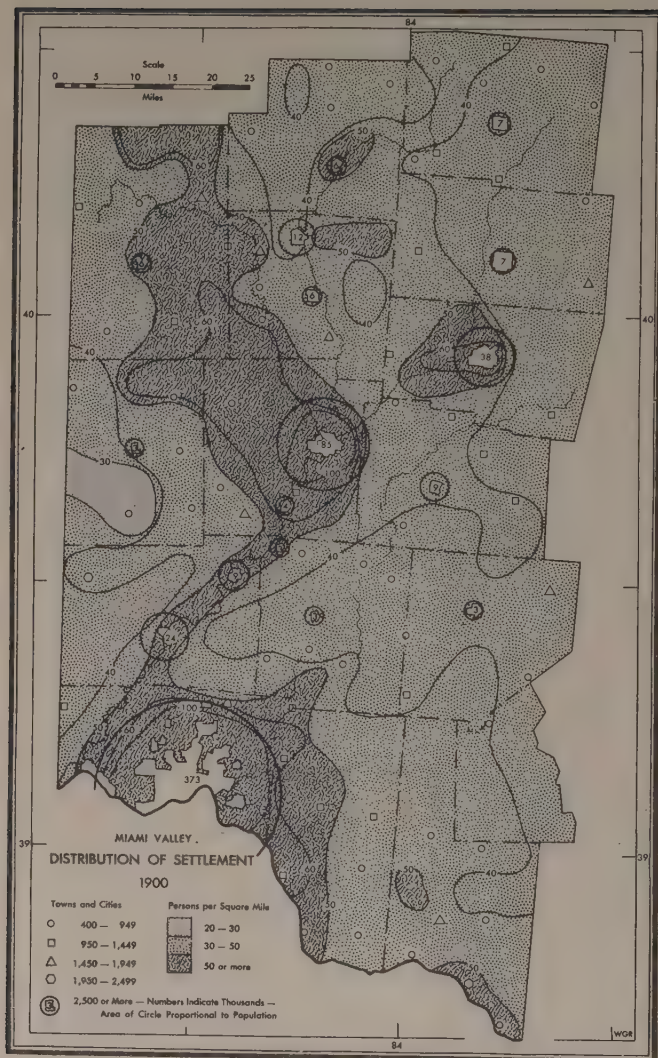


Fig. 10

the Miami Valley during the last half of the nineteenth century, however, does not give by any means a complete concept of what went on in the Valley. How many of the persons in the Valley in 1900 had been there in 1850 or had been born there during the preceding fifty years we do not know. Restless movement was characteristic of the United States during those years. Farmers sold out and moved west; others came to take their places. Town people were also perhaps equally mobile, though their movements have been less noticed and commented on than those of farmers. The Miami Valley, lying in the path of the westward movement, received the full impact of that ceaseless change.

Distribution of Settlement in 1900

In 1900 population density in the larger part of the Miami Valley was between 30 and 50 persons per square mile (Fig. 10). Only a small area along the western border near the center of the Valley had fewer than 30 persons per square mile. A large area with more than 50 persons surrounded Cincinnati and extended northward in a narrow strip nearly to Dayton, where it broadened to surround that city. Between Cincinnati and Dayton in that narrow strip were four Miami River manufacturing towns. Northward from Dayton the area of more than 50 persons broadened, and, leaving the river, crossed the till plains to the northern border of the Valley, enclosing a considerable section of agricultural land. Smaller areas with more than 50 persons per square mile surrounded Sidney and Springfield. There was another narrow strip of similar density along the Ohio River in the extreme southeastern part of the Valley. Areas with more than 100 persons per square mile surrounded Cincinnati and Dayton only.

In the southern and central parts of the Valley the areas of more than 50 persons per square mile were considerably smaller than they had been in 1850, while in the northwestern part of the Valley, the area with more than 50 persons was considerably larger than it had been 50 years earlier (Fig. 9). The sparsely populated northern fringe of the Valley of 1850 had disappeared entirely from the map by 1900.

Changes in Rural Settlement

Excepting rural areas in the immediate vicinity of the larger cities, about 60 per cent of the Miami Valley had a smaller

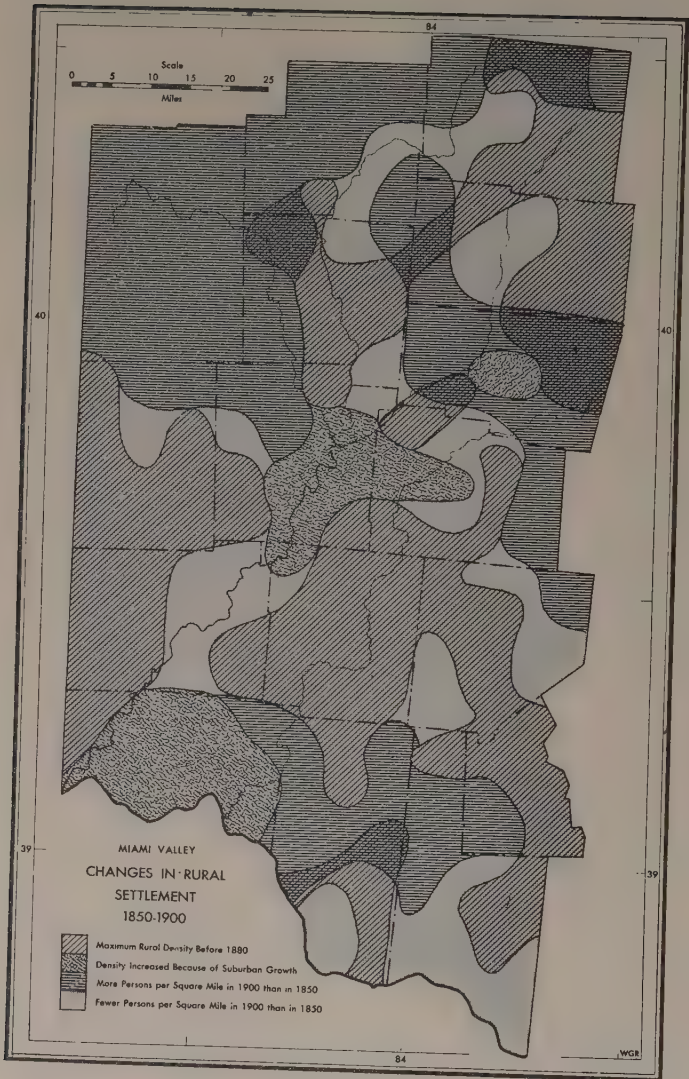


Fig. 11

density of rural population in 1900 than in 1850 (Fig. 11). Decreases varied from one to twenty persons per square mile. The actual amount of decrease varied widely from township to township, but it was somewhat greater in the southern half of the Valley than in the northern half, and it occurred on all three kinds of glacial till. Three areas showed a greater rural population density in 1900 than in 1850, the gains varying from one to fifty-five persons per square mile.

The causes of the changes in the distribution of rural population are hard to evaluate. One difficulty arises from the fact that no data are available on a township or county basis to show just how many of the rural population were dependent on agriculture for a living. Another difficulty arises because of the several, often conflicting, causes which were responsible for the changes in rural population. Some of the causes which tended to increase the rural population were the natural growth of population, an increase in the number of farms in the Valley from 28,000 in 1850 to 49,000 in 1900, and an increase in the acreage of improved farm land from 1,900,000 to 3,400,000 during the same period. Those latter two increases were due in turn to the passage of time which allowed more land to be cleared, transportation to be improved, better markets for farm products to be developed, and completion of drainage facilities which allowed much swampy land to be brought under cultivation. Factors which tended to decrease the density of rural population included a decrease in size of households from 5.8 persons per household in 1850 to 4.4 in 1900 and consequently of the number of persons supported by one farm, a rapid increase in the use of farm machinery, a decrease in the amount of manufacturing carried on on the farms, and the lure of free land in the West or of work in the rapidly growing industrial cities and towns in the Miami Valley.

Areas Which Increased in Density

The largest of the three areas which had a greater density of population in 1900 than in 1850, and the one with the greatest gain, was an area lying entirely on the Early Wisconsin till in the northwestern and northern parts of the Valley (Fig. 11). That area included forty-four townships showing gains of from one to fifty-five persons per square mile, with twenty-two of them having gains of more than twenty persons. A considerable part of that

area was relatively undeveloped in 1850, for most parts had a density of fewer than forty persons per square mile, and the percentage of the total area classed as improved land was less than twenty-five. Reasons for that relative lack of development were its remoteness from the Ohio River, which led to its being settled later than other parts of the Valley; its remoteness from Cincinnati, the principal market center of the Valley; and the poor drainage characteristic of its more nearly level surface of Late Wisconsin till. That poor drainage not only hindered bringing land under cultivation but also delayed the development of roads.

A second area, one in which the density in 1900 was from one to twelve persons per square mile greater than in 1850, lay along the eastern boundary of the Valley with a tongue extending across the Early Wisconsin till to the Late Wisconsin. It included some twenty townships. A third area on the higher, flatter part of the Illinoian till to the east of Cincinnati showed increases of from one to nine persons per square mile. Settlement in those two areas seems to have been delayed less by isolation than was the case in the northwestern area, but both areas lay on flatter parts of the plains and were largely swampy at the time of settlement.

Development of transportation.--Transportation in all parts of the Miami Valley was greatly improved after 1850 by railway operation which began in the late 1840's (Fig. 4). There were but 132 miles of line in the Valley by 1850, but building went on so rapidly that by 1870 there were 837 miles and scarcely any part of the Valley, excepting that in Clermont and Brown counties, was more than eight miles from a railroad. By 1890 there were 1,406 miles, and in all counties practically all farms were within eight miles of rail transportation.

The railway network not only made it possible for farmers to ship products more regularly and cheaply than formerly but also, in connection with lines extending to the eastern seaboard, to reach other markets than Cincinnati or Toledo. That was particularly significant during and after the Civil War, when southern markets, to which farm products formerly went when channeled through Cincinnati, were no longer available to Miami Valley farmers. Even before the War, goods were beginning to move eastward in considerable quantities and that movement was greatly

accelerated by the effects of the War.¹

Turnpike building which began in 1836 went on in the decades following 1850, till by 1870 there were 2,200 miles of such roads in the Valley.² By 1880 there were 4,000 miles of county roads, of which less than 500 miles were toll roads.³ Within a few years all the roads were free. In the early part of the period the improved through roads were of great benefit to the farmers, but as railway transportation improved those roads were neglected. Many more miles of township roads serving local needs were opened during that period also, but in general they remained in poor condition until after the coming of the automobile.

Development of drainage.--In the earlier settled, less level parts of the Miami Valley it had been possible for farmers to construct drainage-ways of their own to handle the troublesome problem of excessive water, because every farm contained some natural channel which would carry the water away. On the more nearly level sections of the till plains, however, that was not possible in many places, for the larger streams were not deeply incised in the till surface and smaller streams had shallow, winding channels. Straightening and deepening of those streams and the cutting of many long ditches were necessary before the farm fields could be drained. The first Act authorizing local governments to construct drainage-ways was passed by the Ohio Legislature in 1847, and that provided only for the construction of ditches in connection with road building. Authorization for construction of drainage ditches to serve farm needs, by township or county authority, was provided for by several Acts passed between 1854 and 1859.⁴ Numerous writers have testified to the fact that advantage was taken of those Acts to construct drainage works so

¹Eugene H. Roseboom, The Civil War Era: 1850-1873, Vol. IV of The History of the State of Ohio, ed. Carl Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1941), p. 113.

²Annual Report of the Secretary of State for the Year 1870 (Columbus: Nevins and Meyers, 1870), pp. 267-268.

³Annual Report of the Secretary of State for the Year 1880 (Columbus: G. J. Brand and Co., 1881), pp. 629-630.

⁴Fifteenth Annual Report of the Ohio State Board of Agriculture for the Year 1860 (Columbus: Richard Nevins, 1861), pp. 245-250.

that more land could be brought under cultivation.¹

The development of community drainage produced a marked improvement in farm land, and that improvement in conjunction with the building of railways was responsible for an increase in farm production. For instance, in Darke County from 1850 to 1870 the amount of improved farm land and the number of hogs increased by almost 100 per cent, while the acreage of corn and of wheat and the number of cattle each increased by more than 100 per cent.²

Area Which Decreased in Density

The area in which the rural population density in 1900 was lower than in 1850 formed a broad band across the Miami Valley a little south of the center, with an extension southward along the eastern boundary to the Ohio River. A northward extension followed the Great Miami River into Logan County where it spread out to include the southern part of that county and thence into a considerable part of Champaign County along the eastern border of the Valley (Fig. 11). Practically all of that area was within the frontier of 1810 (Fig. 8) and about 70 per cent of it reached its maximum density in 1870 or earlier, the remainder by 1880. Decreases amounted to from one to twenty persons per square mile.

Causes for the decrease.--Since that area was the most densely settled part of the Valley by 1850 (Fig. 9) and contained the most improved farm land, there was less room in it for expan-

¹Twelfth Annual Report of the Ohio State Board of Agriculture for the Year 1857 (Columbus: Richard Nevins, 1858), pp. 250-251; Franklin C. Hill, "Report on the Geology of Logan County," Report of the Geological Survey of Ohio (Columbus: Nevins and Meyers, 1878), p. 483; History of Clark County, Ohio, op. cit., p. 693; History of Brown County, Ohio, op. cit., p. 645; Wilson, op. cit., p. 566.

²The increase in crop acreages and number of farm animals were calculated from two-year averages from: Twelfth Annual Report of the Ohio State Board of Agriculture for the Year 1857, op. cit., pp. 21-54; Twenty-sixth Annual Report of the Ohio State Board of Agriculture for the Year 1871 (Columbus: Nevins and Meyers, 1872), pp. 517-522; Twenty-seventh Annual Report of the Ohio State Board of Agriculture for the Year 1872 (Columbus: Nevins and Meyers, 1873), pp. 336-345.

The increase in improved land was calculated from: U. S. Census Office, Seventh Census of the United States: 1850 (Washington: R. Armstrong, 1853), pp. 862-863; U. S. Census Office, Ninth Census of the United States: 1870, Vol. III, Wealth and Industry (Washington: Government Printing Office, 1872), pp. 222-226.

sion after 1850 and, therefore, the causes which tended to reduce the rural population were of greater moment than those which tended to increase it. Chief of those were the introduction of farm machinery, the decreasing size of the family and of the number supported by each farm, and the incorporation of smaller farms into larger ones.

Among the more important labor-saving farm machines which came into use in the Miami Valley between 1850 and 1860 were the steel plow, the thresher, the corn planter, and the reaper. In the next decade the straddle row cultivator and mower became common on the farms.¹ The shortage of manpower caused by the Civil War was a great stimulus to the introduction of farm machinery into the Valley. In 1857 John H. Klippert, Corresponding Secretary of the Ohio State Board of Agriculture, estimated that the amount of machinery introduced on to Ohio farms was sufficient to perform the labor of 100,000 agricultural workers.² Since the Miami Valley at that time contained about 20 per cent of the rural population of Ohio, that would have meant the displacement of 20,000 workers. If that were the case it would not necessarily follow that all those workers left the Valley. Some may have moved on to new farms; others may have found other employment locally, perhaps on the railway lines which were being built at that time.

Ezekiel states that the increase in output per agricultural worker in the United States was 33 per cent for the decade 1870 to 1880, 6 per cent for the next decade, and 22 per cent for the decade 1890 to 1900.³ The decrease in rural population which those figures suggest did not take place in the Miami Valley. That may have been because the total agricultural productivity of the Valley increased, or because many rural workers found other employment locally, or because Ezekiel's figures were not typical of the Miami Valley. His conclusions were influenced by the situation on the larger corn and wheat farms farther west.

The average size of households in the various counties in

¹Lloyd, Falconer, and Thorne, op. cit., pp. 225-231.

²Twelfth Annual Report of the Ohio State Board of Agriculture for the Year 1857, op. cit., p. 43.

³Mordecai Ezekiel, "Population and Unemployment," Annals of the American Academy of Political and Social Science, November, 1936, pp. 230-242.

the Miami Valley varied from 5.5 to 5.9 persons in 1850 and from 3.9 to 4.5 in 1900. Those figures give some rough idea of the number of persons directly supported by each farm in each of the years mentioned, though of course they do not take into account hired laborers who were living under separate roofs from those of the farm operators. In many of the counties the increase in the number of farms was more than sufficient to offset the decrease in the size of families. Considerable parts of counties which had a large increase in the number of farms still had a decrease in rural population. In two of the older counties, Butler and Warren, where the increase in the number of farms was relatively small, the decrease in density caused by reduction in size of households resulted in a loss of three or four persons per square mile. Only two of the townships in those counties show a decrease of fewer than four persons.

From 1850 to 1900 the number of farms between 100 and 500 acres in size in Butler, Clinton, and Warren counties, the three in which the decrease in rural density was greatest, increased at the expense of farms between 20 and 100 acres. That was due in part to the fact that many of the early farmers had farmed with no regard to the maintenance of their soil. No system of crop rotation was in common use before 1850 and manure was ordinarily wasted. In consequence many of the moderately-sized farms became unable to support a family and their owners sold out to more fortunate neighbors who built up the soil by use of crop rotation and manure. That same thing happened to a lesser degree in the other parts of the Valley.¹ The increased investment of capital in machinery also probably made the farms of 20 to 100 acres less economically desirable farm units than they formerly had been. At the same time there was an increase in the number of farms of from three to twenty acres in size, probably largely part-time farms.

Effect of migration upon population density.--Large numbers of people left the Miami Valley during the decades from 1850 to 1900, the majority apparently going farther west, but no figures are available to show the size of such movement since no attempt has been made in the United States to determine birthplace

¹History of Preble County, Ohio (Cleveland: H. Z. Williams and Bro., 1881), p. 174; Twelfth Annual Report of the Ohio State Board of Agriculture for the Year 1857, op. cit., p. 45.

of persons by divisions smaller than states.¹ Numbers of people also left the rural section of the Valley to go to the cities. Both of those movements were in part offset by migrants who came to Ohio from other states and from Europe.

The passage of the Homestead Act in 1862 undoubtedly stimulated the westward movement. Among those who joined that movement were farmers whose farms were no longer capable of supporting them satisfactorily and who sold out to wealthier neighbors. Many of the young men also took up lands in the West because the family farm in the Miami Valley was not large enough to make profitable units if divided among several sons. Some undoubtedly left for the West because they saw greater opportunities there, or went to the cities for similar reasons. It would seem, however, that the basic reasons for most of the emigration must have lain in the condition of agriculture within the Valley itself, and that migration was a symptom rather than a cause of changing conditions.

Time of Maximum Population Density

The maximum density of rural population in different parts of the Miami Valley occurred at various times, in many cases adjacent townships reaching their greatest densities at intervals of two or three decades. Only a very small proportion of the townships had reached their maxima by 1850. The density in the majority continued to rise for one or more decades and the maximum rural population of the Valley as a whole was reached in 1880, though some townships did not reach their maxima until after that date. In general, those townships which reached their maximum population growth before 1880 were those which contained the largest percentage of the steeply sloping parts of the Miami Valley, the dissected stream-trough margins and the areas of steeper terminal moraine. Parts of those townships also extended on to the narrower, better drained portions of the till plains. Those were the parts first chosen for settlement because of better natural drainage and greater accessibility. Because those townships were more completely occupied at an early period, they were

¹U. S. Census Office, Twelfth Census of the United States: 1900. Special Reports, Supplementary Analysis and Derivative Tables (Washington: Government Printing Office, 1906), p. 278.

the first to show a decline in population when reorganization of farm boundaries and increasing use of farm machinery lessened the demand for agricultural labor, and when the decreasing size of households lessened the number supported by any one farm.

Changes in Agriculture

Since the total amount of improved farm land in the Miami Valley increased by almost 1,500,000 acres between 1850 and 1900, there was a considerable increase in acreage of crops. The total amount of land used for growing grains increased by about 45 per cent, while that used for hay crops increased by 183 per cent. Corn continued to be the principal crop, but the relative importance of the most widely grown crops changed somewhat as indicated in Table 7. Those data show a trend toward a three-year rotation of corn, small grains, and hay. The hay included increasing amounts of clover as the years went by.

TABLE 7
COMPARATIVE CROP ACREAGES IN THE MIAMI VALLEY

Crop	For Each 1,000 Acres of Corn	
	Yearly Average 1850-59	Yearly Average 1890-99
Oats.....	220 acres	200 acres
Wheat.....	730 "	840 "
Hay.....	290 "	590 "

Source: W. A. Lloyd, J. I. Falconer, and C. E. Thorne, *History of Ohio Agriculture*, Bulletin 326 (Wooster: Ohio Agricultural Experiment Station, 1918), pp. 265-417.

The kind of farm animals kept also changed during the period. The number of farm animals declined; cattle by 13 per cent, sheep by 42 per cent, and hogs by 41 per cent. While the number of cattle decreased, the quality of the beef animals improved and the proportion of dairy cattle increased. The mixed breeds of sheep of the low value of 1850 were replaced, first by Vermont Merinos, producers of fine wool, and later by cross-breeds which

produced both meat and medium wool. The razorback hogs of the first decades of the century gave way to Chester and Poland China breeds. Those animals were much better fed than their predecessors had been. Sheep and cattle had improved pastures and more hay than they formerly had. More grain was fed to the cattle also, and the hogs were fattened on corn rather than on mast.

Those changes were partly the result of conditions within the Valley, and partly of changes in market prices which more and more came to be affected by nationwide trends in agriculture. Decreasing crop yields led to the adoption of a crop rotation system; for now the Miami Valley farmer, his gray-brown forest soils partly depleted of their fertility, had to compete with the prairie lands farther west. Improvements in local and national transportation made it no longer necessary to drive animals long distances to market, thus eliminating the need for wiry animals. Increased production of meat, grain, and wool in the states to the west brought lower prices for farm products, while increasing land values and use of machinery necessitated greater returns on a larger capital investment. More careful means of farming were essential. At the same time as the center of manufacturing moved closer, the nearby markets for foodstuffs were increasing. Miami Valley farmers adapted their farming to the new situation by more careful and economical production of meat, dairy products, and wheat.

In general, farming practices in the Miami Valley became more uniform as population and farm improvements became more evenly distributed over it. Locally, however, some differences in the forms of land-use developed. Those local differences included a concentration of dairying in the immediate vicinity of the cities, especially Cincinnati and Dayton; production of cigar filler tobacco, chiefly in Darke, Miami, Montgomery, and Preble counties, and of Burley tobacco on the more hilly lands along the Ohio River in Brown and Clermont counties; and great emphasis on the growth of hay for sale in the Cincinnati market, on the Clermont silt loam soils in northern Brown and Clermont counties, and in adjacent parts of Warren and Clinton counties. The effect of the concentration of dairying upon the density of population is not distinguishable on the settlement map because of other causes which led likewise to greater densities in the vicinity of the cities. In the tobacco-growing areas densities were from forty-

five to sixty persons per square mile, above average for rural sections of the Valley. In the timothy-growing area the densities were about forty persons per square mile, not appreciably different from those of surrounding areas.

Growth of Rural Villages

By 1900 there were, excluding the suburbs of Cincinnati, 68 villages in the Miami Valley with populations ranging from 400 to 2,500 (Fig. 10). Those villages, together with sixteen cities, formed a scatter of market towns averaging 9.5 miles apart and rather evenly distributed, so that only a few small areas were more than six miles from one of those trading centers.

Of those sixty-eight villages, ten were not on a railroad, and of those ten, nine were decreasing in size by 1900. Six of them had fewer people in 1900 than they had had in 1850. Of the fifty-eight villages on railway lines, forty-four were still growing in 1900. The remaining fourteen reached their maximum growth one or two decades after the surrounding area reached its maximum population density and were decreasing in size by 1900, although they were still larger than they had been in 1850.

The majority of villages were not only on railroads but they were also at the junction of roads of more than local significance. That the villages were the result of the intersection of roads, rather than that the roads were built to the villages, is suggested by the fact that a large number of them were on the early roads which were comparatively straight, extending from one of the principal towns to another. In the areas surveyed by the township plan, where local roads tended to follow section lines, it is noticeable that the villages were on diagonal roads, in many cases extending in approximately the same directions for a number of miles on both sides of the village, and in some cases connecting the more important urban centers of the Valley or its neighboring counties.

Data concerning occupations of the residents of those villages are extremely meager. Table 8, showing the employment of 548 persons in 1875 in Eaton, a village of about 1,900 persons, is probably fairly typical. The number engaged in manufacturing included 83 employed in cigar making, an industry apparently growing out of local supplies of cigar leaf; and 10 employed in a machine shop which made agricultural machinery. Small agricultural

machinery factories were rather common in the villages at that time. The number of professional people was probably not typical, for Eaton was a county seat and so had an unusually large number of lawyers. One of the causes of the growth of the villages is found in the listing in the directory of thirteen persons in Eaton as "retired." As the country grew older, retired farmers moved to the villages, and that is one of the reasons why many villages grew slowly while the population in the surrounding countryside became less dense.

TABLE 8
EMPLOYED PERSONS IN EATON, 1875

Persons Engaged in	Number
Manufacturing and repairing.	207
Trade.	147
Construction.	85
Professions.	41
Labor.	24
Transportation.	18
Finance, insurance, and real estate.	11
Personal service.	9
All other.	6
Total.	548

Source: Directory of Preble County, Ohio
for 1875 (Eaton, Ohio: B. F. Morgan, 1875), pp.
155-162.

Growth of Urban Population

Urban population in the Miami Valley increased by 229 per cent between 1850 and 1900, but the rate of growth of the various towns and cities was by no means uniform, varying from 37 per cent to 748 per cent (Table 9). In addition to Metropolitan Cincinnati there were in 1900 sixteen towns in the Valley with populations of more than 2,500. Of those, ten grew at a rate greater than that of the urban population of the Valley as a whole. The growth of three of those, Greenville, Sidney, and Bellefontaine, was associated with the large increase in total population at the northern end of the Valley. Four towns which made the greatest growth, 645 per cent or greater, were Dayton, Hamilton, and Middletown on the Miami River, and Springfield on the Mad River. Those four cities became, outside of Metropolitan Cincinnati, the largest manufac-

turing centers of the Valley. Piqua and Miamisburg, Miami River towns, and Urbana on the till plains, also manufacturing centers of some importance, made a less impressive growth. Of the six towns which grew less rapidly than the urban rate for the Valley as a whole, four were on the till plains in the central and southern parts of the Valley, only two were on the Miami River.

TABLE 9
POPULATION AND RATE OF GROWTH, MIAMI VALLEY
CITIES, 1850-1900

City	Population		Increase Per Cent
	1850	1900	
Metropolitan Cincinnati..	118,659	373,141	214
Cincinnati.....	115,435	325,902	183
Dayton.....	10,977	85,333	678
Springfield.....	5,108	38,253	649
Hamilton.....	3,210	23,914	645
Piqua.....	3,277	12,172	269
Middletown.....	1,087	9,215	748
Xenia.....	3,024	8,696	190
Urbana.....	2,020	6,808	237
Bellefontaine.....	1,222	6,649	445
Troy.....	1,956	5,881	200
Sidney.....	1,302	5,688	338
Greenville.....	1,045	5,501	427
Miamisburg.....	1,095	3,941	260
Wilmington.....	1,238	3,613	192
Eaton.....	1,346	3,155	134
Lebanon.....	2,088	2,867	37
Franklin.....	972	2,724	180

Sources: U. S. Census Office, Seventh Census of the United States: 1850 (Washington: R. Armstrong, 1853), pp. 822-849; U. S. Census Office, Twelfth Census of the United States: 1900, Vol. I (Washington: U. S. Census Office, 1901), pp. 306-320.

The rate of growth of urban population in all of the Miami Valley from 1850 to 1900 was less than that for the United States, and only Middletown increased at a more rapid rate than that of the urban population of Ohio, 726 per cent. None of the Miami Valley urban centers grew at even 50 per cent of the rate of the cities in the East North Central part of the country. Three of the Miami River cities and Springfield, however, grew at a rate

somewhat comparable with that of Ohio. Cincinnati, on the other hand, lagged far behind the urban growth of the state as a whole, and in comparison with that of the other metropolitan centers of the East North Central states its growth was almost insignificant. Thus the Miami Valley cities, which in the first half of the century had surged ahead of most other parts of the West, now dropped into a secondary place in growth and regional significance.

Central and Northern Urban Centers

Outside of Metropolitan Cincinnati, every one of the sixteen towns which reached a population of 2,500 persons or more by 1900 had had a population of 1,000 or more persons in 1850. There were, however, an additional five places which had a population of more than 1,000 persons in 1850 which did not reach the 2,500 mark by 1900. Of the sixteen towns which had populations of 2,500 or more and so had urban status by 1900, twelve were county seats, nine had a significant amount of water power, eight were on the Miami River and the Miami and Erie Canal, and twelve had railway connections in at least four directions by 1900. Of the five places which did not reach urban status by 1900 none was a county seat, none had any significant amount of water power, none was on the Miami River or the Canal although two were on the Ohio River, and none had railway connections in more than two directions.

That certain towns in the Valley were ahead of others in 1850, was the result of certain advantages of transportation, power, and central position in their respective counties. Those advantages led to their being trade centers, manufacturing sites, and county seats. When the railways were built those towns were connected with one another and with other cities outside the Valley. The benefit of railway transportation gave them advantage over other communities and their growth continued. Not all of those towns, however, received equal benefit from the building of railways. Dayton and Springfield, first and second among the Valley towns in 1850, were still first and second in 1900. Those two cities were at the most important crossing points of north-south and east-west railway lines. Dayton lay on a north-south line between Cincinnati, and Toledo and Detroit; and on an east-west line between Pittsburgh, and Indianapolis and St. Louis. Springfield was on the same east-west line and also between Cincinnati and Cleveland. Thus they were the most important railroad foci.



Fig. 12

In 1900 Dayton had railway connections by ten lines leading out from the city and Springfield had nine. No other community had more than six connections. Xenia, Urbana, and Bellefontaine which ranked sixth, seventh, and eighth among the Valley towns, each had railway connections extending in six directions but those lines were not all as important as those radiating from Dayton and Springfield. Hamilton, Piqua, and Middletown, third, fourth, and fifth among the Valley towns in 1900, had fewer railway connections than some of the smaller towns but they had the advantage of being served by the more important railway lines.

Hamilton and Middletown had the advantage of being able to tap relatively large underground sources of water, an advantage held also by Dayton, and to a lesser degree by Springfield.

While all of the Miami Valley towns had several functions during the decades from 1850 to 1900, manufacturing was the one which was of greatest importance in affecting population growth in most of them. It is also the only function about which any appreciable statistical data are available.

Growth of employment in manufacturing. --The exact increase in employment and population supported, caused by the increase in manufacturing, cannot be accurately determined because of the lack of data for 1850. In 1850 some 7,000 persons were employed in manufacturing in the Miami Valley outside of Metropolitan Cincinnati. Probably factories in the towns which became urban centers by 1900 employed between 50 and 75 per cent of that number. In 1899 the number employed in those urban centers was 43,000, of which 32,000 were employed in eight Miami River towns, 7,000 in Springfield, and 4,000 in the seven cities on the till plains (Fig. 12).

By 1900 manufacture of machinery was the dominant type in the Miami Valley towns. In 1899 according to the Twelfth Census 20 per cent of the factory wage earners in Dayton, 35 per cent in Springfield, and 53 per cent in Hamilton worked in foundries and machine shops.¹ In the same year 4 per cent in Dayton and 38 per cent in Springfield made agricultural machinery, and 11 per cent of the workers in Dayton made cash registers. The foundries and machine shops in those and other towns of the Valley made parts

¹Census data showing details of manufacture are not available for the other towns.

for other kinds of factories in the Valley and elsewhere; but they made also large quantities of industrial machinery, particularly machine tools, steam and gas engines, and paper mill machinery. Other important types of metal manufacture were the building of safes and vaults in Hamilton, employing 10 per cent of the factory workers there, and the manufacture of metal caskets in Springfield, employing 3 per cent of the workers in that city. The manufacturers of paper and paper products, furniture, and carriages and wagons were also important employers of labor in the Miami Valley by 1900.

That specialization in metalworking in 1900 was very different from the small-scale, diversified manufacture of 1850. In 1850 manufacturing in the towns of the Miami Valley was for local needs, utilizing in large part locally produced agricultural and forest products. Among the industries of that type were flour-milling, tanning, expressing oil, meat-packing, woolen textile manufacture, and furniture and wagon making. Metalworking industries, with few exceptions, were then little more than blacksmith shops, though some of them were making small quantities of industrial machinery. By 1900 many of those manufacturing establishments were of considerable size. One firm in Springfield, making agricultural machinery, employed more than 2,000 workers and six other firms in that city employed between 300 and 500 workers each.¹

The growth in the number employed in manufacturing increased each decade from 1850 to 1900. The most rapid growth occurred between 1860 and 1870, when the number of factory workers increased by 122 per cent; a second period of rapid expansion took place between 1880 and 1890 when the increase was 63 per cent.

Reasons for the growth of manufacturing.--The growth of manufacturing in the Valley was an integral part of the development of the Middle West which went on rapidly during the last half of the nineteenth century. Just as in the early years of settlement the shops of the Miami Valley towns supplied the needs of their developing communities; after 1850 with the aid of rail-

¹W. S. Thomas, "Our Manufacturing Industries--Their History and Present Conditions," The Centennial Celebration of Springfield, Ohio, ed. B. F. Prince (Springfield: Springfield Publishing Co., 1901), pp. 117-132.

ways they developed into factories serving wider markets.

All of the manufacturing towns had at least one railway connection by 1855, and a number of others were completed before 1870. Two developments of special significance to the industrial towns were the consolidation of the short railway lines into through systems connecting the Midwest with the Atlantic Seaboard beginning in 1869,¹ and the building in the 1870's of lines which connected Dayton and Springfield with the coal fields of South-eastern Ohio.

The development of railway transportation gave the Miami Valley towns the opportunity of taking advantage of their greatest asset for the development of manufacturing, namely, their central location in a large market area. It had been, for example, possible to sell agricultural machinery profitably because the Valley for several decades was near the center of wheat and corn production in the United States. Thus production of agricultural machinery, in the beginning serving local markets when the Miami Valley was one of the important areas of grain production, and stimulated greatly by the demand caused by a shortage of farm labor during the Civil War, later developed further to serve wider Midwest markets. Manufacturers of industrial machinery, who first produced to serve the needs of the growing industry of the Miami Valley, were able to widen their markets as capital and technical skill were accumulated at home and as manufacturing expanded in other western cities. As population in the Midwest grew it was possible to find increasing markets for consumers' goods also. Most of the types of goods made in the Miami Valley during that period were bulky articles which moved at comparatively high freight rates, so that it was advantageous to manufacture them in a center of market.

Water furnished the power for the early industries, and that fact explains in part the concentration of manufacturing in the Miami River towns and Springfield. Hardwood, more used then than now in agricultural machinery, could be obtained locally. When rail lines made it possible to secure iron and steel, it was obtained first from the Hanging Rock district in Southern Ohio and later from Western Pennsylvania and Eastern Ohio. As the

¹Charles W. Burkett, History of Ohio Agriculture (Concord, N. H.: The Rumford Press, 1900), p. 65.

industries outgrew the supply of water-power, rail connection made it possible to secure coal. Dayton was within 100 miles of coal fields in southeastern Ohio and within 150 miles of the Middle Appalachian Coal Fields.

Changes in the kinds of goods manufactured.--One of the characteristics of metalworking in the Miami Valley was the facility with which manufacturers changed from one product to another as market demands changed. Some firms which began with the manufacture of wheat-harvesting machinery shifted to corn-growing machinery as the center of wheat production moved farther west, then before the end of the century changed to manufacture of industrial machinery. Changes of that kind were frequent, but each new type of manufacture was carried on with the same kind of equipment and could use the same skilled labor as had been used previously.

Other types of employment in urban centers.--Little information is available about other types of employment in the Miami Valley urban centers. There is none for the beginning of the period and only scant information at its close. Data available are shown in Table 10. The percentages of workers in each group for Dayton and Springfield were very similar. Dayton had a slightly larger percentage of its workers engaged in trade than had Springfield and a correspondingly smaller percentage engaged in manufacture, probably indicating that Dayton was a larger wholesale center than Springfield. If data were available, they might show a distribution of workers in Hamilton, Piqua, and Middletown similar to that of Springfield. In the towns on the till plains, whose function as agricultural markets was relatively more important, the percentage of workers engaged in trade was probably larger, and in manufacturing smaller, than in Springfield.

Metropolitan Cincinnati

Metropolitan Cincinnati grew at the rate of about 36 per cent each decade from 1850 to 1870, 23 per cent from 1870 to 1880, 19 per cent from 1880 to 1890, and 15 per cent from 1890 to 1900. The end of Cincinnati's rapid growth came, therefore, about 1870. The growth for the half century was 214 per cent, a rate which, as has already been pointed out, was much lower than that of the other large centers of the East North Central states.

Although the growth of Metropolitan Cincinnati was rela-

TABLE 10

OCCUPATIONS OF THE GAINFULLY EMPLOYED, DAYTON, 1880
AND 1900, AND SPRINGFIELD, 1900

Occupation	Dayton				Springfield	
	1880		1900		1900	
	Number (000's)	Per Cent	Number (000's)	Per Cent	Number (000's)	Per Cent
Manufacturing..	5.4	38.0	13.8	38.5	6.2	40.0
Trade.....	2.3	16.2	6.9	19.2	2.7	17.4
Personal serv- ice.....	2.0	14.1	4.4	12.2	2.0	12.9
Laborer.....	1.5	10.6	3.7	10.1	1.5	9.7
Construction...	1.5	10.6	2.8	7.8	1.1	7.1
Transport and communication	0.8	5.6	2.0	5.6	0.9	5.8
Professional service.....	0.5	3.5	2.1	5.8	0.9	5.8
Agriculture....	0.2	1.4	0.3	0.8	0.2	1.3
Total.....	14.2	100.0	36.0	100.0	15.5	100.0

Sources: U. S. Census Office, Tenth Census of the United States: 1880, Vol. I (Washington: Government Printing Office, 1883), p. 784; U. S. Census Office, Twelfth Census of the United States: 1900, Vol. II, Part 2 (Washington: Government Printing Office, 1902), pp. 559-594.

tively slow during those decades, its population increased by 254,000, and its manufacturing industries grew so that by 1899, when Cincinnati ranked tenth among the cities of the nation in population, it ranked ninth among them in the number of wage earners in manufacturing.

Areal growth of the city.--During the 50 years of the period here considered, the area within the city limits of Cincinnati increased from 6.1 square miles to 35.5 square miles.¹ Until 1849 the city had remained confined almost entirely to the Basin, but in that year it began to annex settlements on the bluffs over-

¹Measured from "Map of Annexations to the City of Cincinnati" (City of Cincinnati, Department of Public Works, ACC No. 18050, Revised October 26, 1944) (Blueprinted).

looking the Basin and on the highlands above them. Further expansion was hindered by the difficulties of distance from the downtown and industrial sections, and the city became so crowded that in 1860 the average density was more than 22,000 persons per square mile with a considerable fraction of the population of the city living in overcrowded tenements creating grave social problems.¹ Following the beginning of street railway building in 1859² the city began to expand rapidly, not only on the uplands, but also along the valley of Mill Creek. Because of the broken terrain, suburban growth started from many focal points, making the street pattern of the city a disjointed one. Some fifteen of those bordering settlements with intervening areas had been absorbed into the city by 1900, but there were still twenty-seven additional incorporated towns and villages within Metropolitan Cincinnati at that time. The total area of all the incorporated places within Metropolitan Cincinnati was 62 square miles.

Cincinnati's loss of its dominant position.--Even before the Civil War the westward spread of settlement was shifting the center of interest in the Mississippi Valley from Cincinnati toward the West, and another river city, St. Louis, was closely approaching it in population. Railway building still further diverted traffic from Cincinnati, even the main lines from St. Louis to the Eastern Seaboard passed to the north of the city. The annual number of river steamers arriving at Cincinnati increased until 1865, when it became about 3,500 a year. From then on river traffic declined year by year, until by 1899 the number of arrivals was fewer than 1,700.³ Once the railroads began to carry goods between the Midwest and the East, Cincinnati could no longer claim to be the gateway to the West, and its position as a gateway to the South received a severe setback from the Civil War and the economic chaos which followed in the South. By 1870 Chicago and St. Louis, by 1890 Pittsburgh, and by 1900 Cleveland had surpassed

¹Philip D. Jordan, Ohio Comes of Age: 1873-1900, Vol. V of The History of the State of Ohio, ed. Carl Wittke (6 vols.; (Columbus: Ohio State Archaeological Society, 1943), pp. 272-273.

²The City of Cincinnati and Its Resources (Cincinnati: Cincinnati Times Star Co., 1891), p. 28.

³Fifty-first Annual Report of the Cincinnati Chamber of Commerce and Merchants' Exchange for the Year Ending December 31, 1899 (Cincinnati: The Ohio Valley Co., 1900), p. 97.

Cincinnati in population. In 1850 Cincinnati had been the largest meat packing and men's clothing manufacture center of the West; by 1900 Chicago far exceeded it in both those lines. While Cincinnati lost its outstanding position, the rapid development of the Mississippi Valley made it possible for the city to continue its growth, though more slowly than before.

Changes in occupations. --The only reliable data on occupations which have been compiled for Cincinnati are those for the census years from 1870 on. Those data are for the city of Cincinnati, not for Metropolitan Cincinnati, and they show 77,900 gainfully employed persons living in the city in 1870, and 141,700 in 1900. If the ratio of employed persons to total population in the part of Metropolitan Cincinnati outside of the city proper was the same as within the city, it would mean that for Metropolitan Cincinnati there were 79,000 gainfully employed in 1870, and 162,000 in 1900. The percentages of workers in the different occupations given in Table 11 are probably as representative of Metropolitan Cincinnati as they are of the city proper. Since there is a percentage of unskilled labor, 6.3 per cent in 1900, unassigned to any of the groups, the percentages for the major occupations can only be approximately correct.

In 1900 manufacturing heads the list in the percentage of all workers employed, 37.4 per cent of them. Trade came second, employing 22.4 per cent. Transportation and communication occupied 6.6 per cent of the workers, and construction 5.6 per cent. Domestic and personal service, professional service, and a very small number engaged in agriculture account for the remainder.

Between 1870 and 1900 there was an increase of 8.6 per cent in the percentage of all workers engaged in trade, and a 2.0 per cent increase in the proportion engaged in manufacturing. The decrease of 2.7 per cent in construction is what might be expected from the fact that Cincinnati was no longer growing so rapidly in 1900 as it had been in 1870. The increase in the percentage engaged in trade, and that of 2.5 per cent in professional service is probably indicative of changes in the economy of the whole country, rather than being peculiar to Cincinnati. As the economy became more complex, the problems of distribution required the services of more workers and so the percentage of workers engaged in trade increased. As the level of culture rose, the percentage of workers engaged in professional services rose also. These con-

TABLE 11
OCCUPATIONS OF THE GAINFULLY EMPLOYED IN
CINCINNATI, 1870 AND 1900

Occupation	1870		1900		Per Cent Change	
	Number (000's)	Per Cent	Number (000's)	Per Cent	Cincin- nati	Average Four Cities ^a
Manufacturing.	27.5	35.4	53.0	37.4	2.0	0.2
Trade.....	10.8	13.8	31.7	22.4	8.6	7.8
Personal serv- ice.....	15.2	19.5	22.6	16.0	-3.5	-3.4
Transport and communication	6.1	7.8	9.4	6.6	-1.2	-3.2
Laborer.....	8.6	11.0	9.0	6.3	-4.7	-3.0
Construction..	6.4	8.3	8.0	5.6	-2.7	-0.5
Professional service.....	1.9	2.4	6.9	4.9	2.5	3.1
Agriculture...	1.4	1.8	1.1	0.8	-1.0	-0.1
Total.....	77.9	100.0	141.7	100.0	...	...

Sources: U. S. Census Office, Ninth Census of the United States: 1870, Vol. I (Washington: Government Printing Office, 1872), pp. 782-800; U. S. Census Office, Twelfth Census of the United States: 1900, Vol. II, Part 2 (Washington: U. S. Census Office, 1902), pp. 558-587.

^aChicago, Cleveland, Pittsburgh, and St. Louis.

clusions are borne out by the fact that the increases in those two groups in Cincinnati were very similar to those in four other cities of the interior: Chicago, Cleveland, Pittsburgh, and St. Louis. The general trend in changes in the percentages in each of the occupations in Cincinnati is similar to that of those four cities (Table 11).

Advantages and disadvantages of Cincinnati as a site for manufacturing. --From 1850 to 1900 the advantages for distribution of manufactures held by towns of the Miami Valley were shared by Cincinnati. The city was as near markets for agricultural machinery, industrial machinery, and consumers' goods as they. Many of the same railway lines which served the towns of the Valley served Metropolitan Cincinnati. The first rail connection was made with Springfield in 1846, and continued two years later to

Lake Erie; by 1860 there were four other railway lines and by 1900, fourteen. A disadvantage, as compared to Dayton and Springfield, was that Cincinnati did not have so important a position on east-west railroads as had those towns farther up the Valley, a disadvantage partly offset by the fact that four of the city's railways led into the South. In addition to the railways, there was the advantage of river transportation, an advantage of diminishing value, though Ohio River traffic was of considerable importance during the first half of the period. Because of connections established in the days when the river was the main artery of trade and because there was less competitive manufacturing in those directions, Cincinnati's principal markets for most of the goods produced were to the south and southwest of the city. To offset those advantages, however, were the comparatively low buying power of the South, and an inadequate railway network there. It was in an attempt to better its connection with the South, that Cincinnati, in the 1870's, took the unusual step of building a municipal railway to Chattanooga at a cost of \$20,000,000.

One of the handicaps to the development of manufacturing in Cincinnati was the lack of sufficient room for expansion. The amount of sufficiently level land was limited in extent, and industrial use competed strongly with commercial and residential use. The lands most suitable for manufacturing were those by the railways on the floodplain of the Ohio River and Mill Creek, and it was in that locality that the majority of the large factories was located. Industrial expansion outside the city before 1900 had been largely westward along the narrow strip of low terrace and floodplain between the Ohio River and the bluffs. By 1890, some factories had been built as far from the city as Addyston, some twelve miles down the river from the heart of the city.

One result of that crowding was that many factories were forced to build upward, and such types of manufacture as the casting of stoves was done in four- or five-story buildings not well suited to that use.¹ A flood in 1883 and another in 1884 inundated a large part of the industrial area of the city, particularly that occupied by the metal and woodworking plants. Seven factories moved from Cincinnati to Hamilton between 1871 and 1891, two of

¹A. N. Marquis (ed.), The Industries of Cincinnati (Cincinnati: A. N. Marquis and Co., 1883), pp. 152-220.

them before the floods, five within eight years after them.¹

Employment in manufacturing.--The number of persons employed in manufacturing in Metropolitan Cincinnati increased from 30,000 in 1860 to 81,000 in 1899. The number of wage earners had increased each decade from 1850 to 1889, but from 1889 to 1899 the number reported by the Census Office decreased nearly 20,900. The size of the decrease is questionable because it "may be due, in a measure, to the fact that the methods followed in securing reports at the two censuses were not identical, especially in regard to the hand trades, such as boots and shoes, custom work and repairing, etc."² However, there can be no doubt that there was a decrease in the number of wage earners employed in many kinds of manufacture, and that the greatest manufactural activity in the last half of the century occurred about 1890.

During the decade 1889 to 1899 the number of wage earners in the 164 principal cities of the United States increased by 15.6 per cent while in Cincinnati the number decreased by 34.4 per cent, and while the capital invested in manufacturing in the 164 principal cities increased by 41.3 per cent, the amount so invested in Cincinnati increased by only 4.9 per cent.³ Thus it would seem that while Cincinnati was following the national trend in increasing its investment in equipment, it was not doing so rapidly enough to keep employment up to national levels. Part of the decrease in the number of wage earners in Cincinnati was due to the reduction of the number of workers in some factories and part due to the removal of some factories to smaller cities, for example, two safe and vault factories were transferred from Cincinnati to Hamilton in 1890.⁴

The seven industries which employed the greatest number of persons in 1860 employed the greatest number in 1899 (Table 12). Six of those seven industries had become relatively of greater importance as the years passed; for, if we exclude the men's clothing industry, the remaining six employed 35 per cent of the workers in 1899, while they had employed but 24.5 per cent in 1860. Those

¹D. W. McClung (ed.), Centennial History of the City of Hamilton, Ohio (Hamilton, Ohio: Centennial Publishing Co., 1892), pp. 246-503.

²U. S. Census Office, Twelfth Census of the United States: 1900, Vol. VII (Washington: U. S. Census Office, 1902), p. ccc.

³Ibid., pp. ccxx-ccxxi.

⁴McClung, op. cit.

TABLE 12

PERSONS EMPLOYED IN MANUFACTURING IN
CINCINNATI, 1860 AND 1899

Persons Employed in Manufacturing	1860 ^a		1899	
	Number	Per Cent	Number	Per Cent
Men's clothing.....	9,979	33.1	5,003	7.1
Other textile products...	502	1.7	5,700	8.1
Foundry and machine shop products.....	3,102	10.6	7,493	10.6
Other articles of metal..	2,065	6.9	5,882	8.4
Furniture.....	2,955	9.8	3,127	4.5
Carriages and wagons.....	695	2.3	3,174	4.6
Cooperage.....	576	1.9	762	1.1
Other articles of wood...	1,485	4.9	3,507	5.0
Boots and shoes.....	1,745	5.8	7,390	10.5
Leather.....	323	1.1	986	1.4
Other articles of leather	404	1.3	1,343	1.9
Printing and publishing..	1,175	3.9	5,881	8.4
Tobacco products.....	642	2.1	4,447	6.4
Brewing.....	338	1.1	1,571	2.2
Slaughtering and meat packing.....	318	1.1	990	1.4
Other food products.....	647	2.1	3,166	4.6
Soap and candles.....	315	1.0	561	0.8
All others.....	2,802	9.3	9,149	13.0
Total.....	30,046	100.0	70,132	100.0

Sources: U. S. Census Office, Eighth Census of the United States: 1860. Manufactures (Washington: Government Printing Office, 1865), pp. 453-456; U. S. Census Office, Twelfth Census of the United States: 1900, Vol. VIII (Washington: United States Census Office, 1902), pp. 704-709.

^aData for Hamilton County. Handicrafts and small shops included for both years. Construction workers excluded for both years.

six were foundries and machine shops, which employed 10.6 per cent of the workers in both years, and which had advanced from second place in 1860 to first place in 1899; boots and shoes, employing 10.5 per cent in 1899, second in importance in that year; printing and publishing, in third place, had 8.4 per cent of the workers; tobacco with 6.4 of the workers was in fourth place; while carriages and wagons which employed 4.6 per cent of the persons engaged in manufacturing; and furniture manufacture which employed 4.5 per cent were in fifth and sixth places. The men's clothing industry, first in 1860, with 33.1 per cent of Cincinnati's workers, had dropped to fourth place with but 7.1 per cent in 1899.

The products of the foundry and machine shop industries had changed somewhat during the years. From a great variety of machinery in 1850, emphasis by 1899 had come to be placed principally on two types, power-driven woodworking machinery and machine tools. Cincinnati had taken an early lead in the use of power-driven machinery in furniture manufacture, and production of such machinery, first to meet local needs, then to sell elsewhere, became established in the city.¹ Perhaps because the manufacture of machine tools was a relatively new industry in Cincinnati, new methods were adopted which proved highly successful. Each manufacturer specialized in one kind of machinery, though in other areas producing machine tools a variety of tools was made in most shops. In 1899 seven shops made lathes only, five made drilling machines, three made nothing but shapers, and so on. That specialization made it possible for Cincinnati manufacturers to make greater improvements in the machines they made.² So successful were they, that by 1899 Cincinnati was the largest center of machine tool manufacture in the United States.

While Cincinnati was one of the earliest centers of factory production of men's clothing, an industry which in 1860 had employed 33.1 per cent of the workers, the growth of the industry in Cincinnati had not only not kept pace with national growth in that industry, but it actually employed fewer workers in 1899 than it had in 1860 (Table 12). Among the reasons for the decline in employment in Cincinnati was lack of co-operation among the

¹Annual Report of the Commissioner of Statistics for 1857 (Columbus: Richard Nevins, 1858), p. 27.

²U. S. Census Office, Twelfth Census of the United States: 1900, Vol. X (Washington: U. S. Census Office, 1902), p. 385.

manufacturers in improving their industry, and a lack of an adequate program for training of the workers.¹ As the ready-made clothing industry advanced from the low-priced field into the medium-priced, close contact between manufacturer of clothing and manufacturer of woolen goods became more imperative, if the clothing maker was to be able to take prompt advantage of changing types of cloth. Since all the cloth was made in New England, close contact became more difficult for Cincinnati manufacturers; and as retailers began to depend less on making purchases from travelling salesmen, and to go themselves or send buyers to centers of clothing manufacture, they passed Cincinnati by in preference to New York, where a greater choice of styles and materials and more varied entertainment were available.²

An examination of the detailed statistics of manufacture for Cincinnati for 1899 indicates that at least 70 per cent of the persons employed in manufacturing were employed in making consumers' goods.³ Thus Cincinnati was adjusting its manufacturing to its situation on the southern edge of the manufacturing section of the country in an area of increasing markets for consumers' goods. In that respect, Cincinnati's manufacture was in contrast to that of the Miami Valley towns, where emphasis was placed on manufacture of producers' goods.

One of the interesting discoveries in a study of manufacturing employment in Cincinnati is the fact that several of the well-known industries of the city did not receive attention because of the relatively small number of workers they employed. Among them in 1899, slaughtering and meat packing, brewing, distilling, and the manufacture of soap would have merited more attention had the basis for selection of industries been the value of products, rather than the numbers employed.

During the decades when the rapidly growing West was but

¹Industrial Survey of Cincinnati, Vocational Section, Garment Making Industries (Cincinnati: Cincinnati Chamber of Commerce, 1916), pp. 29-49.

²U. S. Bureau of Foreign and Domestic Commerce, The Men's Factory Made Clothing Industry, Miscellaneous Series No. 34 (Washington: Government Printing Office, 1916), p. 147.

³U. S. Census Office, Twelfth Census of the United States: 1900, Vol. VII (Washington: United States Census Office, 1902), pp. 704-709.

poorly connected with eastern manufacturing centers by inadequate lines of transportation, Cincinnati developed a variety of manufactures to meet the diversified needs of the country developing around it. Later as settlement progressed not only did the lines of movement of people and goods shift to other areas, but competitive centers of manufacture developed, many of them perhaps better suited than Cincinnati to the type of production they undertook. It was inevitable that in face of that competition, Cincinnati had to drop some lines of manufacture, and in order to maintain its growth either enlarge those which it kept or develop new ones. In that the city was partially successful, as its increase in number of industrial workers and in total population testified; but the sharp drop in industrial employment from 1889 to 1899 indicates that by the turn of the century Cincinnati's attempt to adjust itself to the changing economy of the Middle West was not meeting with entire success.

Fifty Years of Development

During the years from 1850 to 1900 the Miami Valley developed the major features of its present-day distribution of settlement and the major features of its present-day economy. By 1900 growth of rural population had stopped in practically every part of the Valley. Agriculture had become fixed in its major characteristics, the crops it grew, and the methods of farming it used. At the end of the nineteenth century the entire network of roads had been opened to use, and the railway pattern was practically completed. The urban population of the Valley exceeded the rural, and manufacturing and trade, rather than agriculture, had become the dominant interest of the people. By 1900, its factories had evolved from workshops employing tens of men to mechanized plants employing hundreds. The industrial towns of the Valley had become centers of manufacture of regional rather than of local significance, and Metropolitan Cincinnati was adjusting itself to a relatively less significant position in the regional economy.

CHAPTER IV

INCREASING URBAN CONCENTRATION OF SETTLEMENT

In the years from 1850 to 1900 the rapid growth of employment, chiefly in manufacturing, led to rapid urban growth in the Miami Valley. That trend continued during the first three decades of the twentieth century, and by 1929 brought employment in manufacturing to its highest peak during the 150 years covered by this study. The decline in agricultural population, characteristic of portions of the Valley during the decades before 1900, became general after that year and continued to 1930, reducing the rural-farm population to what was probably its lowest level in ninety years. The three decades also witnessed the beginning of a new growth of rural population, a population residing in the country, but finding employment in the city.

Increase in Population

The population of the Miami Valley increased from 997,000 in 1900 to 1,396,000 in 1930, a gain of 40 per cent. That was a slower rate of growth than the rates for Ohio, the East North Central states, or the United States, which were, serially, 60, 58, and 62 per cent. The growth in the Valley was not more than 10 per cent for the first two decades after 1900, but in the decade 1920 to 1930 the rate of growth was slightly greater than that for Ohio.

The rate of growth of urban population in the Valley was considerably greater than that of total population, being 71 per cent for the three decades, for the urban population increased from 575,000 in 1900 to 985,000 in 1930. The rate of growth was slower for each decade than in Ohio or the East North Central states.

Rural population, on the other hand, decreased at a more rapid rate than that of the East North Central states from 1900 to 1910, but at a less rapid rate from 1910 to 1920. The rate in the Miami Valley then began to increase, and increased more rapidly than in the East North Central states during the last decade



Fig. 13

of the period. That check in the decrease of rural population was the result of the growth of the urban-rural fringe and the total rural population, 411,000 in 1930, was but 10,000 less than it had been in 1900.

Changes in Settlement

There were greater contrasts in rural population density in the Miami Valley in 1930 than there had been in 1900 (Fig. 13). Those contrasts were the result of a decrease in about 75 per cent of the area of the Valley, and an increase in about 25 per cent. The decrease occurred in an area which extended along the eastern boundary from the Ohio River to the northern border, right across the northern end of the Valley and southward along the western boundary to the latitude of Middletown. The principal area showing an increase was a zone some twenty miles in width which extended from the southwestern border of the Valley up the Miami River to Dayton, whence it followed the Miami to Piqua and the Mad River to Springfield, as though the people had drained from the higher lands to the lower. Small areas of increasing rural density also occurred surrounding Sidney and Bellefontaine.

Decreases in rural density varied from one to nineteen persons per square mile, with 60 per cent of the townships in that group having decreases of fewer than ten persons per square mile. Increases in density covered a far wider range. About 40 per cent of the townships showing an increase had gains of fewer than ten per square mile; about 40 per cent had increases of from ten to forty. The remainder, all of them adjacent to cities, had increases of from 80 to 260 persons per square mile.

There was also greater contrast in the distribution of urban and village settlement than there had been in 1900. Within the area where rural population density had increased, the population of the cities and villages had increased also. In the area where rural population had decreased, the population of the majority of the villages had likewise decreased, though in each county in that area one town, the county seat, continued to grow from decade to decade. In the area of decreasing rural population most of the villages which had a greater population in 1930 than in 1900 had reached a high point in 1910 or 1920 and were declining by 1930. The exceptions were a few villages which lay within ten miles of the large area where the population was in-

creasing.

As a result of those changes in population density, the Miami Valley had come by 1930 to have, as pointed out in Chapter I, three kinds of settlement areas: agricultural, with fewer than 50 persons per square mile; the urban-rural fringe, with densities varying from 50 to as many as 400 persons; and the towns and cities.

Urban Growth

The outstanding change in settlement between 1900 and 1930 was the growth of the cities and their associated urban-rural fringe, particularly in the Middle Miami Valley. That growth, in turn, was associated with the increase of employment in manufacturing which was greatly stimulated by the demands of a great war and the period of inflation leading up to 1929. During those decades local manufacturing became more intimately merged in the industrial structure of the whole country because a great many of the Miami Valley factories were taken over by corporations operating similar plants elsewhere. While the rate of urban growth in the Valley was not phenomenal, it made the Valley stand out even more than it had in 1900 in contrast to the lands to the east and west of it.

Rate of Growth

Urban growth continued through the three decades from 1900 to 1930, the increase, 71 per cent, being at a slower rate than in the years before 1900. Since the rural population was decreasing and the urban increasing, the percentage of urban dwellers increased. In 1900, 58 per cent of the population was classed as urban; by 1930, 71 per cent was so classed. In 1930, 37 per cent of the population of the Valley lived in Metropolitan Cincinnati, as had been the case in 1900. The urban centers from Hamilton north through Dayton to Springfield contained nearly 10 per cent more of the total population of the Valley than they had in 1900. River towns farther north than Dayton and the towns on the till plains had continued their growth also, but at a slower rate than the cities from Hamilton to Springfield.

The rate of growth of the individual cities during that period was seemingly an erratic one. Dayton and Hamilton increased at the most rapid rate from 1900 to 1910; Springfield,

Middletown, and Piqua, from 1910 to 1920; and Xenia from 1920 to 1930. One cause for the uneven rate of growth among those cities was the opening of one or more large manufacturing plants within one decade. That was the case at Middletown, where a large steel mill was erected between 1910 and 1920. During that decade the population of Middletown increased by 79 per cent, a greater rate of growth than was made by any other city in the Valley during those decades. The principal reason, however, for the seemingly erratic growth was the incorporation into the cities of territory formerly rural, an action that usually lagged behind the growth of population. Several parcels of land often were annexed at almost the same time, then none was added for years. As a result, a city might have had a quite uniform rate of growth in so far as the number of people associated with it was concerned, but showed an erratic growth when that growth was determined for the area within the corporation limits at ten-year intervals.

Growth of Employment in Manufacturing

The number of wage earners engaged in manufacturing in the Valley increased from 99,000 in 1899¹ to 174,000 in 1929, most, but not all, being employed in the cities (Table 13). That increase amounted to 75 per cent, a rate of increase slightly higher than the rate of urban growth during that period.

During the years from 1899 to 1929 the number of wage earners employed in manufacturing in the United States increased

¹After the Census of 1900 the Bureau of the Census changed the classification of manufacturing establishments to eliminate the hand trades. In order to make comparison with subsequent censuses valid, it is necessary to eliminate the hand trades from the data for 1899. That has not been done by the Bureau of the Census for county figures upon which totals for the Miami Valley must be based. The Bureau has made such correction for data for the largest six manufacturing centers in the Valley in U. S. Bureau of the Census, Thirteenth Census of the United States: 1910, Vol. IX (Washington: Government Printing Office, 1912), pp. 974-983. A comparison of the total number of wage earners in those six centers after correction, with the number of wage earners as reported in U. S. Census Office, Twelfth Census of the United States: 1900, Vol. VIII (Washington: U. S. Census Office, 1902), pp. 690-691, which includes the hand trades, indicates that 12.8 per cent were hand trade workers. The total number of wage earners engaged in manufacturing in the Valley according to the Census of 1900, 114,225, has been reduced by 12.8 per cent, making a total for the Valley for 1899 of 99,600, which is fairly comparable with figures for later years.

TABLE 13
AVERAGE NUMBER OF WAGE EARNERS ENGAGED IN
MANUFACTURING, MIAMI VALLEY CITIES,
1899 AND 1929

City	1899 Number (000's)	1929 Number (000's)
Miami Valley.....	99.6	174.2
Metropolitan Cincinnati....	59.4	85.4
Dayton.....	14.4	40.8
Springfield.....	6.3	12.0
Hamilton.....	5.1	12.1
Middletown.....	1.6	6.8
Piqua.....	2.0	3.2

Sources: U. S. Bureau of the Census, Thirteenth Census of the United States: 1910, Vol. IX (Washington: Government Printing Office, 1912), pp. 973-983; U. S. Bureau of the Census, Fifteenth Census of the United States: 1929, Vol. III (Washington: Government Printing Office, 1933), p. 399.

by 85 per cent, 10 per cent more than in the Miami Valley. Thus the Valley as a whole was not keeping up with the national rate of growth in employment in manufacturing. If we break up the Valley into three parts, a different situation is presented. During those thirty years the increase in Metropolitan Cincinnati was 44 per cent; the increase in the total for the principal four cities of the Middle Miami Valley, Dayton, Springfield, Hamilton, and Middletown, was 161 per cent; and in the remaining parts of the Valley, 42 per cent. It is evident then that one section of the Miami Valley was experiencing industrial growth at a greater rate than that of the United States, while the other sections were falling far behind the national rate.

Manufacturing employment in Middle Miami Valley.--The industrial centers in the Middle Miami Valley included the four cities of Dayton, Springfield, Hamilton, and Middletown, and in addition the towns of Miamisburg, Franklin, and West Carrollton lying between Middletown and Dayton. There were also some factories in the vicinity of those cities and towns which formed a part of their industrial pattern. The total number of wage

earners employed in Butler, Montgomery, and Clark counties, which contained all of the cities and towns mentioned above, was 74,600 in 1929. Very few wage earners in those counties were employed outside the industrial centers. Of the total, 71,700 were employed in the larger four cities (Table 13).

The average number of wage earners does not show the total number of persons dependent on manufacturing, nor are figures available which do show that for the entire Middle Miami Valley; but the occupation statistics for the larger four cities account for a majority of the workers, and the percentages derived from them may be considered as representative of the entire industrial area.

Of the 151,500 gainful workers¹ residing in the four cities in 1930, 70,900, or 46.7 per cent, reported work in connection with manufacturing as their occupation. The percentages in the various cities were 44.3 in Dayton, 46.9 in Springfield, 54.0 in Hamilton, and 54.2 in Middletown. Of the total number of factory workers in those four cities, 67.2 per cent was engaged in the manufacture of metal products, 7.7 per cent in the manufacture of paper and paper products, and 7.4 per cent in printing and publishing.

The manufacture of machine tools, power generating machinery, calculating registers, paper mill machinery, and safes and vaults were as important types of manufacture as they had been in 1900. New metalworking industries included the manufacture of refrigerating machinery, motor trucks and automobile parts, and electrical equipment. A steel mill at Middletown, supplied with pig iron by a blast furnace near Hamilton, was an addition after 1900. The manufacture of agricultural machinery had almost entirely disappeared from the Valley.

Paper manufacture continued to employ significant numbers of workers and the manufacture of paper products, particularly paper bags and cartons, had developed. Printing and publishing were relatively more important than in 1900.

During the years from 1900 to 1930, the Miami Valley, still

¹The term "gainful worker" as used in the census data for 1930 includes persons temporarily unemployed as well as those employed. U. S. Bureau of the Census, Fifteenth Census of the United States: 1930. Population, Vol. III, Part 2 (Washington: Government Printing Office, 1932), p. 3.

advantageously near a number of large centers both of manufacturing and of consumption of goods, continued to produce bulky articles, many of them requiring great skill in manufacture; but it had changed the nature of a number of the goods made to meet the needs of a changing industrial world.

One of the striking changes in the development of manufacturing in the Middle Miami Valley was the great increase in the size of manufacturing establishments. In 1929 eleven establishments, each with 1,000 or more workers, furnished employment for about half the factory workers in that part of the Valley. Eight of those eleven employed more than 2,000 workers, and two of them more than 8,000 each. All of the eleven were in the larger four cities.

Manufacturing in smaller urban centers.--Growth of employment in manufacturing outside of Metropolitan Cincinnati and the Middle Miami Valley increased 42 per cent between 1899 and 1929. Most of that increase took place in three towns along the Miami River north of Dayton: Troy, Piqua, and Sidney. The towns on the till plains made little progress.

Metalworking was the principal type of manufacture in all of the smaller urban centers, except in Piqua, where the number employed in manufacture of woolen goods exceeded the number making metal products. In general, the types of goods made were similar to those made in the Middle Miami Valley, mainly the products of foundries and machine shops. Other types of manufacture included electrical equipment, airplanes, cordage, and shoes.

No data are available to show the importance of manufacturing in relation to total employment in those smaller urban centers in 1930. The largest number of wage earners in any one of the centers was 3,228 in Piqua, a place of 16,000 inhabitants.

Manufacturing employment in Metropolitan Cincinnati.--The average number of wage earners in manufacturing in Metropolitan Cincinnati increased from 59,400 in 1899 to 88,900 by 1919, then declined to 85,400 in 1929. That decline was in marked contrast to the situation in the Middle Miami Valley where the trend in manufacturing employment was upward throughout the three decades. About 65,900 residents of the city of Cincinnati reported work in factories as their occupation in 1930. That was 32 per cent of the employed persons who lived in the city. The percentages so employed in some of the industrial suburbs were probably higher,

but in Metropolitan Cincinnati as a whole the percentage was probably about the same as for the city proper.

Available figures on employment in the various kinds of manufacturing are not complete and not entirely comparable with those for 1899 given in Table 12, but it is possible to draw some conclusions regarding the relative significance of the more important types. Men's clothing held about the same relative place in the percentage of workers employed, as did the metalworking industries. The manufacture of soap was of relatively greater importance in 1929 than it had been in 1899. Four industries which showed a decrease in relative importance were printing and lithographing, manufacturing of furniture, tobacco products, and boots and shoes. The latter two suffered a large decrease in the numbers employed.

Among the machinery group machine tools continued to lead, employing nearly 5,000 wage earners. Among the new industries which had developed since 1900 were the manufacture of electrical and radio equipment, automobile assembly, and the manufacture of automobile parts. Not enough new industries had come to Cincinnati, however, to allow it to maintain growth in manufacturing employment and during the last ten years of that period there was a loss of nearly 3,500 wage earners. Large manufacturing establishments were not numerous, for in 1929 only eight employed more than 1,000 workers each, and but two of those more than 4,000. Small- and medium-sized manufacturing plants were more common than large ones for the average number of workers in the 2,000 factories was but forty-two.

Changes in Occupations

The data regarding occupations in the cities in 1900 and 1930 unfortunately are not comparable in many respects; nevertheless, the differences in percentages employed in some occupations are sufficiently large to allow some conclusions to be drawn. One of the difficulties arising from the use of those data is the inclusion in the 1900 figures of a group of laborers unassigned to any particular industry group. Were those laborers assigned to such occupations as manufacturing, transportation, and construction they would probably increase the differences between the years, at least in the case of Cincinnati, beyond what they appear to be from the tables.

In Cincinnati between 1900 and 1930, as shown by a comparison of Tables 11 and 14, manufacturing; trade including in 1930 finance, insurance, and real estate, which were not shown separately in 1900; and perhaps personal service decreased in relative importance. Construction may have been relatively more important in 1930 than in 1900. The transportation and communication and professional groups were even more important and seem to have followed the national trend. The decline in the relative importance of manufacturing seems applicable to the city of Cincinnati only, and in Metropolitan Cincinnati the percentage engaged in that pursuit was probably unchanged.

TABLE 14
PERCENTAGE OF WORKERS BY INDUSTRY GROUPS,
MIAMI VALLEY CITIES, 1930

Industry Group	Cincinnati	Dayton	Springfield	Hamilton	Middletown
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Manufacturing.....	32.4	44.3	46.9	54.0	54.2
Trade.....	16.8	15.4	14.7	12.8	12.0
Personal service.....	13.6	12.1	10.1	8.0	9.5
Transportation and communication.....	8.2	4.9	5.9	4.3	4.2
Construction.....	7.9	7.2	5.1	6.1	5.9
Professional service...	7.3	6.0	5.8	5.2	5.1
Finance, insurance and real estate.....	3.6	2.8	2.4	2.4	2.5
Government.....	3.5	2.9	2.7	2.4	1.7
Automobile repairing...	1.2	1.3	1.0	1.4	1.7
Recreation and amusement.....	1.2	0.1	1.0	0.5	0.8
Hand trades.....	0.8	0.8	0.7	0.5	0.8
Agriculture.....	0.7	0.7	2.0	0.5	0.8
Industry not reported..	2.8	1.5	1.7	1.9	0.8
Total.....	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of the Census, Fifteenth Census of the United States; 1930. Population, Vol. III, Part 2 (Washington: Government Printing Office, 1932), pp. 514-515.

The cities of the Middle Miami Valley had larger percentages of their populations working in factories than did Cincinnati, and consequently smaller percentages engaged in other groups. Comparison of Table 10 with Table 14 shows that between 1900 and 1930 manufacturing became relatively more important in regard to employment of labor in both Dayton and Springfield, though it seems possible that if the unassigned labor group could be properly assigned the change would not be a large one. Apparently while the number employed in manufacturing increased greatly in both of those cities, increase in other occupations kept up with it. That was true even in the number engaged in trade, if allowance be made for the group which included finance, insurance, and real estate.

Manufacturing employed 54 per cent of the workers in both Hamilton and Middletown in 1930, the other occupations smaller percentages in almost every case. The smaller percentages engaged in trade were to be expected because neither Hamilton nor Middletown was a wholesale center of any importance, and the retail stores of Cincinnati and Dayton attracted trade away from local stores. A similar situation occurred with respect to some forms of professional service.

Growth of Urban-Rural Fringe

There had been, throughout the growth of cities in the Miami Valley, a fringe of population clustered most densely near the city limits and thinning out into the country. Until about 1900, however, that fringe seems to have been a narrow one resulting from the growth of subdivisions which sooner or later were taken within the corporation limits. About 1900, while the development of subdivisions adjacent to the cities continued, a scattered growth of homes of persons employed in the cities began to appear extending outward some miles from the cities. Evidence of that new type of development in the vicinity of Dayton can be found on the topographic sheets of quadrangles surveyed between 1903 and 1906.¹ Such scattered homes in the country were most in evidence along the interurban electric railway lines which were

¹U. S. Geological Survey, "Brookville, Ohio, Quadrangle" (Washington, 1907), "Dayton, Ohio, Quadrangle" (Washington, 1906), "Miamisburg, Ohio, Quadrangle" (Washington, 1908).

being built rapidly after 1895,¹ but they appeared also along roads where there were no electric lines. Evidence of the growth of the urban-rural fringe found in census data on population seems to indicate that growth had begun in the vicinity of Dayton by 1900, though in townships immediately adjacent to the city the history of rural population is difficult to trace because from time to time portions of the rural area with unknown numbers of persons were annexed to the city. Also in the vicinity of Cincinnati so many villages grew up almost adjacent to the city, many not reported in the census because they were unincorporated, that the scatter of rural population is completely obscured.

The settlement of the urban-rural fringe may be thought of as comprised of two phases: one, the arrest of the decline in rural population density then going on in other parts of the Valley, and two, the addition of more persons beyond the number supported on farms in 1900. By 1920 the isopleth of fifty persons per square mile west of the Miami River, from near the mouth of the river to northern Preble County, was in almost exactly the same place as it was in 1900, thus indicating that the decline of rural population had been checked along that line. In northern Preble County it had moved somewhat eastward, toward the river, indicating that rural population density was still declining in that area. North of Dayton, as well as east and south of that city, there was very little change in the position of that isopleth. From the vicinity of Franklin southward to the Ohio River, the isopleth of fifty persons per square mile was three or four miles farther east than it had been in 1900, indicating that in that area not only had the decline of rural population been stopped but additional persons had moved into the area.

The principal growth of the urban-rural fringe, made possible by the increasing use of the automobile and the improvement of roads, took place between 1910 and 1930, the larger part of it in the latter decade. The establishment of bus lines operating along some roads was also a factor, busses taking the place of the electric railways, which by 1930 were disappearing from the Valley.

While the isopleth of fifty persons per square mile has

¹John Merrill Weed, "The Traveled Ways," Ohio in the Twentieth Century, Vol. VI of The History of the State of Ohio, ed. Carl Wittke (6 vols.; Columbus: Ohio Archaeological and Historical Society, 1942), p. 138.

been chosen as marking the limits of the urban-rural fringe, it should not be thought of as being an exact limit. The boundaries of the urban-rural fringe would be too nebulous to define so sharply even if the most precise information about the settlement pattern were available.

In some of the townships in the immediate vicinity of Cincinnati and Dayton the percentage of rural-farm population in 1930 was less than 15 per cent of the total population, but in most parts of the urban-rural fringe it was between 15 and 50 per cent. Not all of those rural-farm people, however, depended entirely on farming for their livelihood. Data to show the occupations of the rural-farm population in 1930 not being available, the percentage of part-time farmers cannot be determined.

Settlement in the Agricultural Area

In the agricultural area, comprising .75 per cent of the Miami Valley, decreases in population density of from one to nineteen persons per square mile occurred between 1900 and 1930. While it was not true in all parts of the Valley that the townships with the greatest density in 1900 lost the most heavily in the next thirty years, that was the general trend, and by 1930 the rural population was more evenly distributed than it had been in 1900.

In the northern part of the Valley losses of more than ten persons per square mile occurred almost entirely in those areas which had a greater population in 1900 than in 1850. In the southeastern part of the Valley there was a large area which had lost more than ten persons per square mile, only a part of which was in the area which had shown a gain between 1850 and 1900.

By 1930 the density of population in the agricultural area varied from twenty-one to fifty persons per square mile (Fig. 13). Higher densities were found in the vicinity of a few larger towns, marking the presence of small areas of urban-rural fringe. In general, the lower densities occurred along the eastern and western borders of the Valley, with greater densities in the center.

While data showing the occupations of working persons by counties are available for 1930, it is impossible to segregate the rural working population from the urban, and percentages based on county totals are almost meaningless where two such dissimilar groups of people are involved.

Causes of Decline in Population

Causes of the decline in agricultural population included a decrease in the size of households, a decrease in the number of farms and amount of land in farms, and increasing use of mechanically propelled machinery. Eight counties lay entirely, or almost entirely, within the area of agricultural population. In those eight, Brown, Champaign, Clinton, Darke, Logan, Miami, Preble, and Shelby, the number of persons in private households varied from 3.9 to 4.3 persons in 1900. In 1930 it varied from 3.0 to 3.3 persons. Those figures indicate that approximately one person fewer was supported on each farm in 1930 than in 1900. In 1930 there was an average of more than one household per farm and that was probably the case in 1900, though no data are available on the subject. That would seem to indicate that the decrease amounted to more than one person per farm. Since there were 22,800 farms in those eight counties in 1930, the decrease in population due to that one factor alone would be at least 22,800 persons.

The number of farms in 1930 was 3,800 fewer than in 1900. That would account for a loss of some 15,500 persons, which, added to the decrease attributable to the decrease in the size of households, would mean a decrease of about 38,300 persons. The decrease in rural population in those counties was actually 31,500 persons. The discrepancy is due partly to the roughness of the calculations and partly to the fact that in 1930 there were more non-farm persons living in the rural parts of the agricultural area than in 1900.

The decrease in the size of households was due to fewer children per family and less farm labor. No comparable data are available giving age distributions by counties for 1900 which would make it possible to determine the decrease due to the smaller number of children in each household. The cause of the decreased use of labor was the adoption of mechanical power which permitted the use of larger farm implements and a more rapid rate of work. The use of the tractor and motor truck in farm work began after 1910 and it is estimated that by 1940 it had increased the output of Ohio farm workers by 40 per cent.¹ Not all of the farms in the

¹John I. Falconer, "Agricultural Changes," Ohio in the Twentieth Century, ibid., p. 123.

agricultural area used such machinery, but a sufficient number did to make a significant change in the demand for farm labor.

Another result of the increased dependence on machinery was a still further increase in the size of farms, a trend which had already begun before 1900. The average size of farms in those eight counties entirely in the agricultural area increased from 85 acres in 1900, to 94 acres in 1930, and the number of all farms 100 acres or more in size increased from 32.6 per cent in 1900 to 38.5 per cent in 1930. That in turn was partly responsible for the decrease in the number of farms of 14.3 per cent between 1900 and 1930. Another cause of the smaller number of farms was the decrease of 5.2 per cent in the amount of land used for farming.

Changes in Agriculture

Agriculture in 1930 involved growing essentially the same crops and animals as it had in 1900. Improvement in the quality of livestock continued and greater emphasis was put on dairying and poultry production than in 1900. That change was a response to increased urban markets for dairy and poultry products, markets made easier to reach by improvement of roads, and the use of motor trucks.¹ Alfalfa and soybeans were two new field crops which were gaining in popularity. A number of small canning factories had been built in the agricultural area also, but in 1930 only about 3,800 acres of truck crops, mainly sweet corn, were grown to supply them.

Development to a Turning Point

Between 1900 and 1930 the most striking industrial development was the rapid growth of industry and population in the cities of the Middle Miami Valley. Metropolitan Cincinnati, which had hesitated in its industrial growth in the decade before 1900, again hesitated in the decade before 1930. During those years agricultural population further reduced itself in adjusting to new methods of farming, and parts of the country were becoming the homes of urban workers.

The year 1930 marked the end of a trend of 80 years' duration in the Valley, during which time urban growth had been more

¹Ibid., pp. 123-125.

rapid than rural. In the decade following, rural population growth exceeded urban. As a result of years of severe depression the growth of employment in manufacturing, continuous since almost the beginning of settlement, ceased and country and village homes were again filling. Still the major features of the pattern of settlement and economy established before 1930 continued to be the major features in the decade that followed.

CHAPTER V

SETTLEMENT AFTER ONE HUNDRED AND FIFTY YEARS

Settlement in the Miami Valley until 1840 was a forward movement spreading northward from the Ohio River into a new and untouched country. Even in those days, however, there was a counter-movement southward of settlers going to the Ohio River to find their way farther west. People came and went, but the number remaining in the Valley increased decade by decade. By 1840 a skeleton of settlement had been effected; thereafter movements became more diffuse. People shifted from one part of the Valley to another, many moved on westward, their places taken at once by settlers from the East or from Europe. The farm country was fully occupied; cities were built. Gradually settlement was adjusting itself to the capacity of the land to produce and to the potentiality of the urban sites to serve their manifold functions.

No barriers separated the Miami Valley from other parts of the great Interior Lowland. Settlement was going on all around it, providing at the same time markets for its products and services, and competition for those same products and services. A step ahead of many other areas of settlement, the Miami Valley held a temporary advantage over them, but soon lost that advantage and was forced into making new adjustments of agriculture and urban functions. The one hundred and fifty years of settlement also experienced the industrial, agricultural, and transportation revolutions. Settlement was constantly adjusting itself to a changing technology, economy, and society. Nor had the need for such constant readjustment ended. The distribution of settlement in the Miami Valley in 1940, therefore, did not constitute a climax; it was simply another stage in a shifting pattern which had been changing for one hundred and fifty years.

In the pages which follow, the details of settlement in 1940 are discussed, as are the trends evident at that time, and, since settlement was dependent on work available for the earning portion of its population, a considerable part of the chapter is devoted to the industry groups which provided employment.

Distribution of Settlement

The dominant feature of the distribution of settlement in 1940 was the cities. The urban-rural fringe extending from the Ohio River to the neighborhood of Springfield was another division, while the agricultural area comprised a third (Fig. 2).

Urban Settlement

At first, centers of local trade and in many cases of local government, the Miami Valley cities soon began to manufacture goods either to make possible profitable shipment of local farm produce or to create goods to serve local needs. In time manufacturing became the dominant function of many of the cities, and from 1850 to 1930 urban settlement grew more rapidly than rural. By 1940 the urban centers contained 69 per cent of the population of the Valley. Metropolitan Cincinnati, because of its comparatively great size and its metropolitan functions, stood alone among the cities of the Valley. The industrial cities of the Middle Miami Valley stood together because of their great emphasis on manufacturing. The cities of the upper Miami River and the till plains formed another group, since their functions as local trade and governmental centers were relatively more important, and manufacturing relatively less so than in the case of other cities.

Metropolitan Cincinnati.--The outpost established on the north bank of the Ohio River in the winter of 1788-89 as the gateway to the Miami Country had grown by 1940 to be a metropolitan center of more than 500,000 persons. The surge of early settlers pouring through Cincinnati into the Miami Valley soon changed the outpost into a small city which became not only a trade and manufacturing center for the Valley, but for the West and Southwest as well. Each decade thousands swelled the population until in the 1850's the city outgrew the basin and climbed the surrounding slopes to the upland. As trade and manufacturing expanded with the growing West, tens of thousands of new citizens arriving in the following decades brought the city, in the early 1880's, to the halfway mark in its growth to the level of 1940.

Development of new lines of movement to the upper Mississippi Valley robbed Cincinnati not only of its position as a gateway to the West but even as gateway to the Miami Valley, and the growth of rival trade and industrial centers caused the rate of

growth to become progressively slower each decade until 1920. In the boom years of the 1920's the rate of growth increased again, only to drop back during the 1930's to the slowest rate in the history of the city, a rate, however, not far below that of other cities in the East North Central states.

By 1940 Cincinnati extended over 72.4 square miles of lowland and upland. Its twenty-two incorporated suburbs, some of them surrounded by the city, some adjacent to it, and others a few miles away, covered another 24.3 square miles. On that 96.4 square miles lived 557,200 persons who gained their livelihood principally from manufacturing and trade in what had now become a secondary urban center in the Eastern Interior Lowland.

Industrial centers of the Middle Miami Valley.--Industrial growth, assuming significant proportions after the coming of the railways in the 1850's, had by 1940 created Middletown, Hamilton, and Springfield, with serially, 31,000, 51,000, and 71,000 inhabitants. Still larger was Metropolitan Dayton, a community of 218,000. Available water-power in each of those centers, and a position of transportational advantage beside the Miami and Erie Canal in the case of three of them, had made them centers of manufacture for local needs even before the coming of the railways. It was, however, railway connection with western markets and eastern sources of steel and coal which made it possible for them to reach wider markets and to develop large-scale manufacturing, much of it of machinery requiring skill in metalworking. Changing demands of market and competition from other manufacturing centers caused new types of goods to be made and new markets to be found, but total production increased and the basic emphasis remained on machinery. To meet the needs of that expanding industry the population of those centers grew through the years, somewhat unevenly, but only in an occasional decade did any one of the industrial centers of the Middle Miami Valley make a growth of less than 20 per cent.

As in other cities of the country, the rate of growth from 1930 to 1940 was a slow one, Hamilton even losing more than 1,500 persons. The population of Dayton and Middletown, while increasing more slowly than in previous decades, grew more rapidly than the average urban center of the Eastern Interior Lowland. By 1940 those four centers of the Middle Miami Valley contained within their limits 25 per cent of the people in the Valley, and

some thousands more lived in the urban-rural fringe surrounding them.

Cities of the Upper Miami River and the till plains.--A dozen smaller cities scattered over the till plains or along the Upper Miami River had reached populations of more than 2,500 persons by 1940. The largest of those centers was Piqua on the Miami River, a city of 16,000. Four others, with approximately 10,000 persons each, were Sidney and Troy on the Miami and Xenia and Bellefontaine on the till plains. Of the dozen centers, nine were county-seats. Early chosen to serve that function because they were centrally located in their respective counties, those places soon became the foci of county and Valley roads and came to serve as local trading centers. At least a small amount of manufacturing became established in all of them. The trend of settlement in all of the county-seat towns was alike. All grew at about the same rate as did the counties which they served until the peak of county growth was reached at some censual year between 1870 and 1900. After that peak in county population was reached the county-seats continued to grow, but more slowly than before, the rate of growth in the decades to 1930 being chiefly dependent on the growth of employment in manufacturing. Troy and Sidney particularly had increasing employment in metalworking industries.

Rural Settlement

The tide of settlement which swept up the Miami Valley and made farms of almost all parts of it by 1850, had begun to ebb soon after, gradually reducing and somewhat equalizing agricultural settlement. Soon after 1900 a counter tide, sweeping out from the cities, had first checked the declining population in the lower and central Miami Valley, and then gradually built settlement up to, or even higher than earlier levels, forming the urban-rural fringe.

In the decade from 1930 to 1940 the rural population in the Valley increased by 52,300, the greatest gain in a decade since 1840-50. Perhaps 44,000 of that gain was in the urban-rural fringe, increases in the agricultural area being slight, though in some areas upsetting a downward trend of many years' duration. The larger part of the gain was of non-farm people.

Agricultural areas.--The subsistence farming of pioneer days soon gave way to commercial farming as transportation facili-

ties and markets improved, and maximum agricultural settlement of the Valley reached its peak by 1880. Even before that date the farm population in the southern, earlier-settled part of the Valley had begun to decline, largely because mechanization of agriculture lessened the need for labor and families were decreasing in size. In the swamplier sections of the Valley settlement continued to expand; but eventually in all of the agricultural area the number of large farms increased, households grew smaller, and population became less dense.

During the years from 1930 to 1940 the downward trend was checked in about half of the agricultural area by a small increase of 8,000 persons. The districts in which that check occurred were scattered and irregular in shape and there was no conformity between them and the natural features of the land. The increase in rural farm population accounted for only 3,600 of the 8,000, and there is no evidence that it indicated any significant change in the trend toward larger farms and a decreased use of labor in farming. In the counties where there was an increase in the number of farms, the increase was very slight, and in some counties the number of farms decreased. Apparently the increase in rural-farm population in the agricultural area was caused primarily by the continued residence on farms of persons who in more economically favorable periods would have left them for industrial work.

In the other half of the agricultural area, the downward trend continued through 1940, though at a decreasing rate, as if in those districts too there had been a damming up of persons on farms because of lack of employment elsewhere.

Scattered through the agricultural area were some fifty villages with 400 to 2,100 persons each, settlements which had risen with the agricultural population, had grown slightly for a decade or two after the surrounding area had ceased its growth, and then declined. In about 90 per cent of those villages there was some increase in numbers between 1930 and 1940, though the increases were usually modest ones. As in the case of the farm-lands surrounding them, there is no evidence that the check in their decline was more than a temporary one, an outgrowth of lack of economic opportunity in the industrial centers.

Urban-rural fringe.--The urban-rural fringe was the newest of the settlement phenomena in the Miami Valley, primarily a product of the use of the automobile. While undoubtedly there was

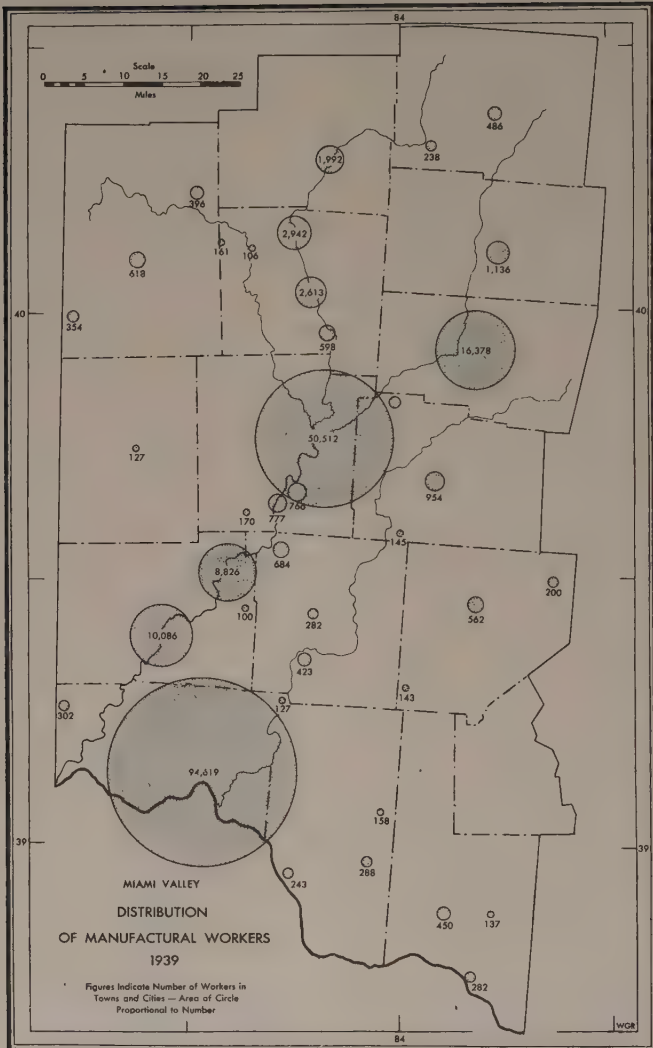


Fig. 14

some part-time farming in the urban-rural fringe prior to 1930, it seems to have consisted in most cases of two separate types of settlement intermeshed: farms, and homes of urban workers. The decade 1930-40 saw an increase of some 44,000 persons, many of whom had erected cheap or temporary homes in areas where taxes were lower and building restrictions less severe than in the urban centers. The increase included a considerable group of rural-farm people, perhaps 10,000 of them; and the urban-rural fringe gained a large number of small farms, mainly less than ten acres in size, with a large number of part-time farmers. That new trend changed somewhat the nature of settlement in the urban-rural fringe.

The greatest growth within the urban-rural fringe took place in the townships immediately adjacent to the cities where there were increases of from 30 to 150 persons per square mile. In areas slightly more remote from the cities, the growth amounted, for the most part, to ten persons or fewer; however, the rate of growth was greater than within the cities. Many of the villages within the urban-rural fringe also grew at a rate greater than the cities.

Basis of Settlement: Manufacturing

The hand trade shops which marked the beginning of manufacturing in the Miami Valley had changed to modern factories by 1940, employing in that year 182,000 persons or 35 per cent of the total number of employed persons in the Valley (Table 1). Thus manufacturing had come to dominate the economic life of the Valley, and the pattern of settlement for approximately 35 per cent of the population depended directly on manufacturing for a livelihood. The number indirectly supported by manufacture cannot be determined, but the total supported both directly and indirectly must have been well over half the total population.

Distribution of Workers

Population dependent on manufacturing in 1940 was highly concentrated, for a few cities which had taken an early lead in industrial development had grown to such a degree that they overshadowed all the others (Fig. 14). Approximately 44 per cent of all industrial workers lived in and near Metropolitan Cincinnati, and 46 per cent in the industrial cities of the Middle Valley and the urban-rural fringe surrounding them. About 5 per cent of the

total for the Valley lived in or near the towns of the Upper Miami River, Troy, Piqua, and Sidney. The remaining 5 per cent lived in other parts of the Valley, concentrated chiefly in and around the urban centers on the till plains.

Factories in Cincinnati furnished employment for 32.2 per cent of all the workers living in that city, a percentage, if allowance be made for differences in census classification, not far from that of 1870 and 1900 (Table 11). In the industrial cities of the Middle Miami Valley, where manufacturing between 1860 and 1870 apparently had become the most significant basis for settlement, the relative importance of manufacturing had become so great that by 1940 it employed 45.0 per cent of the workers in Dayton, 45.7 in Springfield, and 49.0 and 52.5 per cent in Hamilton and Middletown, respectively (Table 15).

In Piqua, an Upper Miami River city where manufacturing had made an early start but not great progress, manufacturing was still the most important employer of labor, using 44.8 per cent. In Xenia, a town on the till plains, it employed but 21.5 per cent of the workers.

Types of Manufacturing

Metalworking, particularly the manufacture of machinery and articles containing some mechanical devices, early appeared in the industrial scene in the Valley and increased in relative importance, until by 1940 it was the most important type of manufacturing. Data for 1939 (Table 16) indicate that metalworkers constituted 49.5 per cent of all factory workers. That increase in the importance of manufacture of articles of metal was in accord with the national trend of increased use of metals in industries and in homes. The Miami Valley cities, due to their central location in an area of relatively dense population and not far from a number of large urban centers (Fig. 1), were in a good position to fabricate bulky metal articles of rather high value. In Metropolitan Cincinnati, whose manufacturing was more diverse than in the other cities of the Valley, metalworking occupied 36.6 per cent of all the factory workers. In the Middle Valley the percentages of workers so employed varied from 57.0 per cent in Middletown to 73.8 per cent in Dayton. In the smaller cities of the Valley metalworking had become established early, but in most of them it had not made much progress by 1940. In Urbana,

TABLE 15

PERCENTAGE OF WORKERS BY INDUSTRY GROUPS,
MIAMI VALLEY CITIES, 1940

Industry Group	Cincinnati	Dayton	Springfield	Hamilton	Middletown	Piqua	Xenia
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Manufacturing.....	32.2	45.0	45.7	49.0	52.5	44.8	21.5
Retail trade.....	17.2	16.5	16.4	15.8	14.4	17.4	21.7
Personal service.....	10.6	8.3	8.3	7.9	9.6	9.7	10.4
Professional service..	9.6	7.1	6.6	6.8	6.5	6.3	9.9
Transportation, communication and other utilities.....	8.3	4.7	7.1	4.5	4.3	4.6	9.5
Construction.....	5.0	3.9	3.8	4.5	4.3	4.8	6.8
Finance, insurance, and real estate....	4.8	2.8	2.5	3.3	2.5	2.2	3.4
Wholesale trade.....	3.6	2.3	2.2	1.6	1.1	2.6	4.5
Government.....	3.6	4.7	2.3	2.7	1.8	2.3	5.2
Automobile and business repair service.	2.2	2.0	1.8	1.4	1.6	1.8	2.9
Amusement and recreation.....	1.1	0.9	1.0	0.7	0.7	0.7	1.2
Agriculture.....	0.4	0.3	1.1	0.4	0.3	1.0	1.8
Industry not reported.	1.4	1.5	1.2	1.4	0.4	1.8	1.2
Total.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Population, Vol. II, Part 5 (Washington: Government Printing Office, 1943), pp. 679-683, 705, 726.

Wilmington, Greenville, and Xenia the relative importance of metal-working was declining, in Bellefontaine and Piqua it had made no progress in twenty years, but in Troy and Sidney such industries were developing rapidly, and those two cities appeared by 1940 to be falling in line with the industrial towns on the Middle Miami River as growing centers of that type of industry. The growth of much of the metal manufacture in the larger towns was associated with large capital investments made by the leading manufacturing interests of the country. The smaller cities, for the most part,

TABLE 16

PERSONS EMPLOYED IN MANUFACTURING, MIAMI VALLEY
AND PRINCIPAL CITIES, 1939

Type of Manufacturing	Miami Valley		Metropolitan Cincinnati		Dayton	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Metal articles..	99,567	49.5	34,458	36.6	37,256	73.8
Food.....	19,707	9.8	10,536	11.2	3,466	6.9
Printing and publishing....	16,343	8.1	9,216	9.8	3,030	6.0
Textiles and products.....	13,241	6.6	9,883	10.5	522	1.0
Paper and paper products.....	12,208	6.1	2,795	3.0	1,792	3.5
Wood articles...	8,081	4.0	5,079	5.4	713	1.4
Leather articles	6,129	3.0	4,557	4.9	77	0.2
Soap.....	4,625	2.3	4,316	4.6	303	0.6
All other.....	21,377	10.6	13,341	14.1	3,353	6.7
Total.....	201,238	100.0	94,181	100.0	50,512	100.0

Metal Articles

Foundry and ma- chine shops...	26,722	13.3	13,467	14.3	5,613	11.2
Mechanical re- frigeration...	13,164	6.6	1,530	1.6	11,514	22.7
Electrical machinery.....	13,008	6.5	3,853	4.1	6,715	13.3
Automobiles and parts.....	12,626	6.3	3,676	3.9	2,739	5.4
Calculating machinery.....	8,524	4.2	316	0.3	8,208	16.3
Iron and steel..	5,127	2.6	325	0.3	102	0.2
All other.....	20,396	10.0	11,291	12.1	2,365	4.7
Total.....	99,567	49.5	34,458	36.6	37,256	73.8

Source: Department of Industrial Relations, Directory of Manufacturers in Ohio in 1939 (Columbus: Department of Industrial Relations, n.d.), pp. 157-323.

TABLE 16--Continued

Springfield		Hamilton		Middletown	
Number	Per Cent	Number	Per Cent	Number	Per Cent
11,299	69.0	5,852	58.0	5,035	57.0
575	3.5	566	5.6	137	1.6
2,982	18.2	319	3.2	71	0.8
218	1.4	267	2.6	.....	.....
67	0.4	2,904	28.8	2,463	27.9
402	2.4	88	0.9	.....	.....
194	1.2	.....	.....	.....	.....
.....					
635	3.9	90	0.9	1,120	12.7
16,378	100.0	10,086	100.0	8,826	100.0

1,749	10.7	2,620	26.0	441	5.0
.....					
1,080	6.6	37	0.4	29	0.3
5,128	31.3	550	5.4	.....	.....
.....					
.....	.....	385	3.8	4,417	50.0
3,342	20.4	2,260	22.4	148	1.7
11,299	69.0	5,852	58.0	5,035	57.0

did not attract such capital, partly because there were relatively fewer laborers available in the smaller centers.

Among the more important types of metalworking in the Valley were a number which involved the making of machines or articles which contained mechanical devices. Some of them were machine tools, power generating machinery, motor truck and automobile parts, and calculating machinery (Table 16). Metropolitan Cincinnati, where machine manufacture in the Valley had begun, was by 1939 in a secondary place with 24,200 workers, while 35,400 worked in machine manufacture in Dayton.

In 1939 scattered establishments preparing food products employed 9.8 per cent of the industrial workers in the Valley. Food preparation involved mainly the manufacture of things ordinarily prepared in the market center such as baking and the preparation of dairy products. For that reason food manufacture was found in villages as well as in cities. Vegetable canning, also carried on in the smaller centers, was another form of food preparation, though employment was seasonal.

Printing and publishing continued to be centered chiefly in the three cities where it had been for many years, Cincinnati, Dayton, and Springfield, several thousand being employed in that way in each city. The publishing firms found those cities desirable places for distribution of their products because of the central location in the densely populated northeastern quarter of the country. In all the Valley 8.1 per cent of the workers in manufacturing were employed in printing and publishing.

Paper and paper products manufacture employed 6.1 per cent of all the factory workers. Paper manufacture was concerned with the production of many kinds and grades of paper, much of it made for special purposes. Paper products manufacture was chiefly concerned with production of packaging materials for industrial users.

The only other type of manufacturing employing more than 5 per cent of the factory workers was that of textile products, employing 6.6 per cent. Seventy-five per cent of the total for the Valley was employed in Metropolitan Cincinnati, chiefly in making men's clothing.

Manufacturing and Urban Growth

The growth of the larger cities of the Valley was closely

tied to the growth of employment in manufacturing. In the pages which follow, that relationship will be traced for three cities: Cincinnati, which has contained a large fraction of the total population of the Valley throughout the period of settlement; Dayton, the leading city in the Middle Valley; and Piqua, a city which made comparatively little growth after the turn of the century.

Cincinnati: Manufacturing and urban growth.---Accurate data are not available which show the percentage of workers employed in manufacturing in Cincinnati for years earlier than 1870. Between that year and 1940 approximately 33 per cent of the workers were so engaged, indicating that manufacturing was the direct source of livelihood of about one-third of the metropolitan settlement. In the early years of the city's growth the relative importance of manufacturing must have been much less than that, and in the decades from 1840 to 1870 it can scarcely have been any higher. Rather diverse types of manufacture were characteristic of Cincinnati throughout its industrial development, but the relative importance of the various types changed through the years.

In the years before 1850 probably more than 50 per cent of the industrial workers in Cincinnati were engaged in manufacturing of articles made from local agricultural and forest products. Those goods were manufactured not only for sale in the Valley but also in the area reached by the Lower Ohio and Mississippi rivers. The manufacture of machinery for local use and use in the South had grown until by 1850 it employed about 25 per cent of all the factory workers. A third important group of manufactures during that period was that of men's clothing, said to have grown out of the demands of river men for ready-made garments.

During the years following 1850, manufacture of products from local raw materials became relatively less significant. In manufacture of articles of wood the percentage of workers engaged had dropped from 18.9 per cent in 1860 to 3.7 per cent in 1940. Leatherworking, principally the making of shoes, had grown in importance through 1900, and then declined until in 1940 it furnished employment for but 4.5 per cent of the workers. The manufacture of clothing, which had grown to such importance in Cincinnati that it employed about 35 per cent of all the industrial workers in 1860, employed but 8.7 in 1940.

Metalworking, which had employed 17.5 per cent of the factory workers in 1860, increased slightly its relative importance by 1900 with 19.0 per cent, and by 1940 with 37.5 per cent of the workers who lived in the city. It was the growth of the metalworking industries which saved Cincinnati from a very severe setback as the woodworking, clothing, and shoe industries declined.

It is evident that the relatively rapid growth of Cincinnati until 1850, and its slower but still comparatively large growth to 1880, was in part due to the increase in manufacturing which allowed a large number of additional persons to find work in the city each decade. Opportunities for work in manufacturing continued to increase rapidly until 1890 without a corresponding increase in the total size of the settlement. Manufacturing employment decreased between 1890 and 1900, then rose to a high point about 1920, a point from which it declined in the next twenty years. Population in Metropolitan Cincinnati continued its growth during those years, but much more slowly than before.

Dayton: Manufacturing and urban growth.--The earliest data showing the number employed in manufacturing in Dayton were for 1860 when there were 1,800 wage earners employed in the city.¹ By 1880 manufacturing was supporting 38.0 per cent of the workers living in the city, and by 1930, 44.3 per cent. By 1940, the figure for the city had increased to 45.0 per cent and for Montgomery County, whose industrial workers were largely employed in Dayton, the figure was 44.5 per cent. Evidently manufacturing was the lifeblood of the Dayton settlement.

Dayton's industrial pattern was changing during the years between 1860 and 1900, for in the latter year at least 41 per cent of the factory workers were employed in metalworking, whereas in 1860 only 28 per cent had been so employed. The percentage engaged in manufacture of articles of wood had decreased from 21 in 1860 to 7 per cent in 1900, for local supplies of wood were almost exhausted while steel was becoming more plentiful. Two kinds of manufacture scarcely present in 1860 were making of tobacco products and printing and publishing, which by 1900 employed 11 and 7 per cent of the workers. One group among the metalworkers in 1900 was of special importance. That group was the 1,600 persons employed in making cash registers. Its significance to Dayton was

¹Annual Report of the Secretary of State for the Year 1865 (Columbus: Richard Nevins, 1868), p. 25.

twofold. A large number of workers, 8,200 in six factories in 1940, came to be employed in making cash, fare, and other registers, and the introduction of that industry marked the beginning of the precision industries in Dayton. Skilled laborers attracted by that industry or trained in it in Dayton made the city a good one in which to develop other types of manufacture requiring a high degree of skill. By 1940, Dayton not only manufactured registers but also was a center for the manufacture of precision tools.

Data for 1940 indicate that 67.6 per cent of the industrial workers who live in Dayton were engaged in manufacture of metal articles, of whom about 70 per cent were engaged in making machinery. Printing and publishing employed 7.6 per cent of the workers in 1940, manufacture of foodstuffs 6.9 per cent, and of paper and paper products 3.3 per cent.

It is evident that the growth of Dayton and the surrounding rural zone was highly dependent on manufacturing for its existence. Since much of that manufacture was so closely in line with present-day trends of emphasis on intricate articles of machinery, and since much of the plant and equipment was relatively new, and since a great amount of research in industrial problems was being conducted there, not only by private industry but also at the government airfields nearby, it seems likely that the Dayton community will continue to make rapid industrial growth.

Piqua: Manufacturing and urban growth.--Piqua, one of the smaller industrial centers of the Valley, had made a steady but rather slow industrial growth until 1927 but had failed by 1940 to recover from the unemployment caused by the depression years. The city is on the Upper Miami River, and factory manufacture had its beginning there in 1839 when a flour mill was built using water-power from a lock on the Miami and Erie Canal, constructed to that point two years previously. Piqua was growing rapidly because it was for the time being the head of navigation on the Canal, and was a collecting point for goods moving southward by water, and a dispatching point for goods leaving the Canal to move north and northwestward. Additional water-power was provided in 1865 by the construction of a power canal, some four miles in length, to bring water to the city. By 1880 there were at least twenty factories in the town including flour-mills, a woolen mill, machine shops, linseed oil mills, furniture factories,

carriage and wagon shops, cooperage works, a tool handle factory, straw paper mills, and breweries. Even by that time, however, a shortage of wood was beginning to be felt, for the output of cooperage was decreasing.¹ Census data giving the number of wage earners engaged in manufacturing were not compiled for Piqua before 1900, but it is evident from the county totals that the number could not have been greater than 500 in 1860, nor more than 1,200 by 1890. Census data indicate that the number of wage earners in the town in 1900 was 1,955 and that from that year to 1927 the number increased steadily to 3,344. The number decreased in the years of the depression in the 1930's, but rose to 2,652 in 1937 to fall again to 2,158 in 1939.

The manufacture of textile products, including underwear, hosiery, and woollens, employed 47 per cent of the workers in 1918; metalworking 26 per cent; and wood-using industries 13 per cent.² The situation had not changed significantly by 1940, and Piqua was not among the Valley cities where machine-manufacture was making progress.

It seems probable that, at least since 1870, manufacturing had been the source of livelihood of at least 33 per cent of the population of Piqua. In 1940 the figure was 45 per cent but that was a smaller percentage than in 1927 and the city made practically no growth in population from that time to 1940.

Basis of Settlement: Agriculture

While the growth of manufacturing in the Valley had pushed agriculture into the background as the prime basis of settlement, nevertheless, in very considerable areas it was still the primary source of livelihood of the people. The 48,900 persons employed in agriculture in 1940 constituted 9.3 per cent of the employed population, and agriculture probably supported directly that percentage, if not more, of the total population. In the following pages will be discussed first, the distribution of farm labor in the Valley and second, the growth of agricultural

¹History of Miami County, Ohio (Chicago: W. H. Beers and Co., 1880), pp. 448-451.

²The Industrial Commission of Ohio, Directory of Ohio Manufacturers, 1918 (Columbus: The F. J. Heer Publishing Co., 1918), pp. 220-221.

settlement in Preble County which is representative of the rural area.

Distribution of Farm Labor

The number of farm workers, that is, working proprietors, tenants, and laborers in 1940, varied from 4.5 to 11.2 per square mile in the agricultural area (Fig. 15). The sections with fewer than five workers per square mile were very small. About half of the agricultural area had from five to seven workers per square mile, most of the remainder from seven to nine. In eastern Darke County and the adjacent part of Miami County densities varied from nine to eleven workers. Both the highest and lowest densities in the agricultural area were found on the Late Wisconsin till, and there seemed to be no relation between densities and either productivity of the soil or degree of relief.

In the urban-rural fringe densities varied from five to thirty-three workers per square mile. The highest densities were in the vicinity of Cincinnati, though even there, there was wide variation, for in townships adjacent to the city densities varied from ten workers to thirty-three per square mile. In the vicinity of Springfield the density was sixteen, but the concentration was not so marked around Dayton, to the west of the city it was eleven, on the other sides it varied from six to eight. Densities around Hamilton and Middletown were only moderate. While specialized types of farming such as truck gardening and poultry raising accounted for a part of the concentration of farm workers around the cities, it seems likely that, since many of the small farm tracts near the cities were occupied by persons who preferred to work in the cities when employment was available there, the number of farms in any given year would be roughly in inverse ratio to the urban employment. That seems to have been the case in 1940 though it would take data collected over a number of consecutive years to prove the point. In the urban-rural fringe, farther from the cities, the density of workers was similar to that of adjacent parts of the agricultural area.

In 1940, 42,700 rural-farm residents were employed in agricultural pursuits, or 65 per cent of all the employed rural-farm population. If we assume that that 65 per cent supported the same percentage of the rural-farm population, then the number of persons supported per agricultural worker was 2.93. On that basis

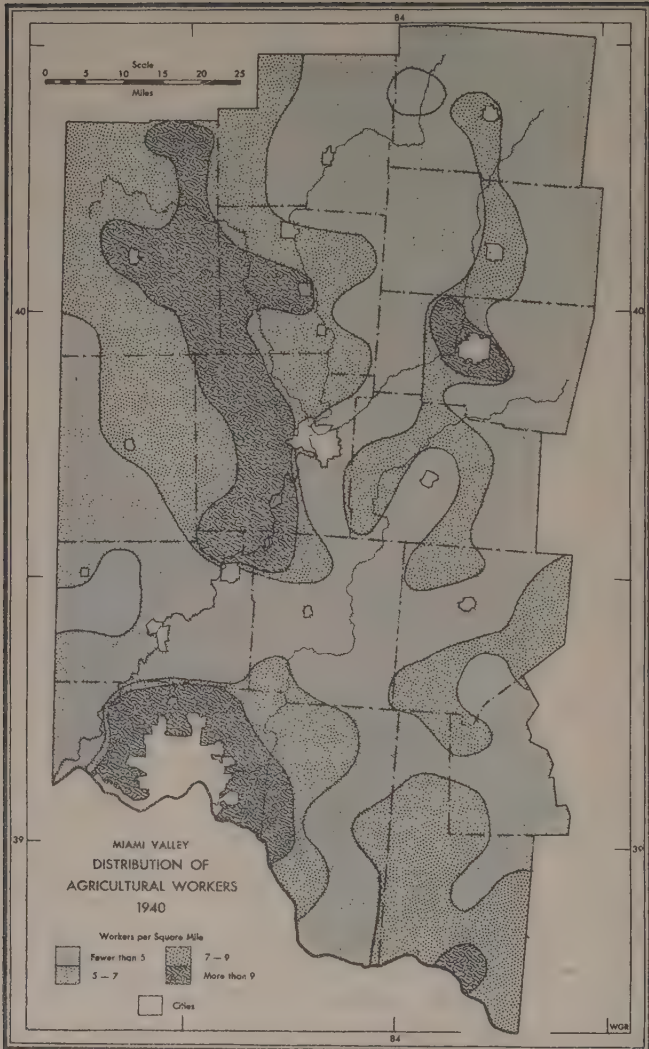


Fig. 15

the number of persons supported directly by agriculture was from eleven to thirty-three per square mile in the agricultural area and from fifteen to ninety-six in the urban-rural fringe.

Changing Agricultural Settlement in Preble County

The distribution of settlement in a large part of the Valley had been based from the beginning on agriculture. Part of the settlement in rural areas was directly dependent on the land, a part which had been immeasurable for most of the period of settlement because the rural-farm population was not enumerated separately and compiled by counties until 1930. In certain sections of the Valley, however, the villages and towns were, though indirectly, as dependent on the land for existence as the rural-farm population has been. Preble County was such a part of the Valley, for manufacturing and trade had never been of more than local significance, and only within the last two decades had their been any appreciable employment of Preble County residents outside the county.

The settlement of Preble County began in 1802 and within ten years there was a scatter of settlement in all parts of it. By 1830 agriculture passed the subsistence stage of the pioneer communities, and the population density varied from thirty to forty-five persons per square mile. Commercialization of agriculture made great progress in the next decade, for the opening of the Miami and Erie Canal greatly improved connections with markets since no part of the county was more than thirty-five miles from the Canal and fully half less than twenty miles from it.

By 1850 six of the twelve townships in the county had reached their maximum population, and at that time the density varied from thirty-three to forty-five persons. In that year there were some 1,800 farms in the county and 47 per cent of it was classed as improved farm land. After 1850 the introduction of machinery and the decreasing size of farms had a tendency to decrease the demand for labor on the farms. That tendency was partly offset by an increase in the number of farms and in the amount of improved farm land, an increase encouraged by the coming of railways in the 1850's. Population density declined in some townships after 1850 and increased in others. The maximum population for the county was reached in 1880, but the number of farms reached its maximum in 1910, and by that time 82 per cent of the

county was classed as improved farm land. After 1910 the number of farms begin to decline, but the proportion of larger farms which had been increasing since 1860 continued to increase to 1940.

On the assumption that in 1910 and earlier the entire population of the county was directly or indirectly supported by agriculture, the number of persons supported per square mile of improved farm land was 100 in 1850, 82 in 1880, and 67 in 1910.

By 1940 the economic basis of settlement was not so simple as it had been in earlier decades, for by that time a number of workers, perhaps 10 per cent of the total employed and living in Preble County, were employed outside the county, chiefly in Dayton, Middletown, and Richmond, Indiana. In that year 42 per cent were engaged in agriculture and there was no manufacturing of any significance carried on in the county. If we assume that the remainder of the employed persons, 48 per cent, was supported in proportion to the numbers engaged in agriculture and to those employed outside the county, then four-fifths of that 48 per cent was employed in serving those engaged in agriculture and one-fifth in serving those employed outside the county. Thus about 80 per cent of the population of Preble County in 1940 was directly or indirectly supported by the use of the 349 square miles of improved farm land, an average of fifty-three persons per square mile of such land.

Basis of Settlement: Retail Trade

Second to manufacturing in the number of workers was retail trade which in 1940 occupied some 78,000, or 14.9 per cent of all the employed persons in the Valley (Table 1). Retail trade was therefore the support of a considerable fraction of the settlement. Most of those workers were engaged in serving others who lived in the Valley, though in the case of trade centers near the borders of the area, particularly in the case of Cincinnati, that was not entirely true.

Distribution of Workers

Of all persons engaged in retail trade in 1939,¹ 49.2 per

¹The percentages are based on the number of active proprietors plus the average number of employees for the year

cent were employed in Metropolitan Cincinnati and 31.3 per cent in the industrial towns of the Middle Miami Valley. The towns of the Upper Miami River contained 3.2 per cent, and places on the till plains of more than 2,500 persons contained 5.6 per cent. All village and country stores employed 10.7 per cent. The distribution of retail trade workers in cities of more than 2,500 population is shown in Figure 16.

The number of persons engaged in retail trade in a community, expressed as a percentage of the total population of that community, gives a somewhat different concept of the importance of trade in the economic life of the Valley.¹ In Metropolitan Cincinnati and in the industrial cities of the Middle Miami Valley from 5.5 to 7.4 per cent of the population were so engaged. In the till plains towns the relative significance of trade was greater, varying from 7.4 to 10.9 per cent, and indicating that the smaller cities depended more on trade for their existence than did the industrial centers. Data for villages and hamlets, if available, probably would show an even higher percentage engaged in retail trade. Since it is possible to determine such percentages for more cities than when industry group figures for 1940 are used, the number of retail workers expressed as a percentage of the total population shown in Table 17 will be used in the discussion which follows.

Retail Trade in Metropolitan Cincinnati

The number of persons engaged in retail trade in Metropolitan Cincinnati in 1939 was 38,500 or 6.9 per cent of the population. The Cincinnati trade area was considered the area including all or part of twenty-six counties, eight in Ohio, of which six and part of a seventh were in the Miami Valley, five and a part of a sixth in Indiana, and eleven and a part of a twelfth in

1939. Those figures are used in preference to the statistics of employment by industry groups because the former are available for a greater number of cities than are the latter. Comparison of the two sets of figures for cities where such comparisons are possible, indicates that, in so far as percentage distribution of workers is concerned, there is no significant difference between them.

¹Of necessity the figures used are for average employment in retail trade for the year 1939, and the population as of April 1, 1940. While some error is introduced by the differences in dates, it is probably insufficient to affect the conclusions drawn.

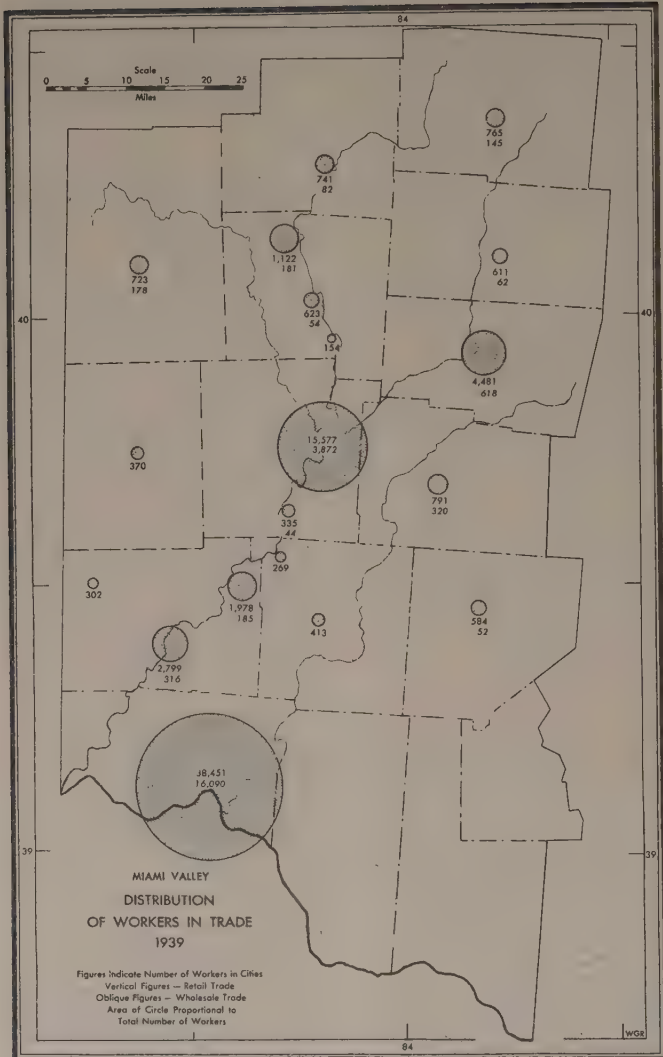


Fig. 16

TABLE 17

NUMBER OF WORKERS AND PERCENTAGE OF POPULATION
ENGAGED IN RETAIL TRADE, MIAMI VALLEY
CITIES, 1939

City	Number	Per Cent of Population
Metropolitan Cincinnati..	38,451	6.9
Dayton.....	15,577	7.4
Springfield.....	4,481	6.3
Hamilton.....	2,799	5.5
Middletown.....	1,978	6.4
Piqua.....	1,122	6.8
Xenia.....	791	7.5
Bellefontaine.....	765	7.8
Sidney.....	741	7.6
Greenville.....	723	9.4
Troy.....	623	6.4
Urbana.....	611	7.4
Wilmington.....	584	9.8
Lebanon.....	413	10.6
Eaton.....	370	10.4
Miamisburg.....	338	6.5
Oxford.....	302	10.9
Franklin.....	269	6.0
Tiptecanoe City.....	154	5.3

Sources: U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Census of Business, 1939, Vol. I, Part 3 (Washington: Government Printing Office, 1941), pp. 546-548; U. S. Bureau of the Census, Sixteenth Census of the United States: 1940. Population, Vol. I (Washington: Government Printing Office, 1942), pp. 29-43.

Kentucky. The total population of that area in 1940 was 1,244,000, of which 69 per cent lived in the Miami Valley. The retail trade area extended farther southward and eastward from the city than in other directions. Northward Dayton and Springfield were competitors of Cincinnati. To the northwest Indianapolis and to the southwest Louisville were rival trade centers, the boundaries in those directions being about half-way between Cincinnati and those two cities. To the south Lexington, Kentucky, and to the southeast Portsmouth, Ohio, and Huntington, West Virginia, were competitive shopping centers; but since they were much smaller cities than Cincinnati, the larger city drew customers from more than half the distance.

The purchasing power of the part of the retail trade area immediately adjacent to Cincinnati was relatively high, but east, west, and south of the city it was lower.¹

Retail Trade in the Middle Miami Valley

While manufacturing was the dominant activity of the urban centers in the Middle Miami Valley, retail trade was also of considerable importance. Since the cities were not far apart there was considerable overlapping of trade areas and the southern cities also lay within the Cincinnati retail trade area. Evidence of the overlapping is found in four maps of retail trade areas, no two of which are in agreement as to the boundaries of the retail areas of any one of the cities.²

Dayton.--Dayton was the largest retail trade center among the cities of the Middle Miami Valley with 15,600 workers so engaged in 1939. The percentage of the population engaged in retail trade, 7.4 was significantly above that of other cities in the East North Central states of comparable size. The retail trade area of which Dayton was the center was not a large one. Montgomery County and the western part of Greene comprised its primary area. Dayton shared part of the trade of Preble and Darke counties with Richmond, Indiana, and of Miami and Shelby counties with Piqua. Eastern Greene County trade was shared with Springfield. The relatively large employment of workers in retail trade in Dayton was probably quite as much a reflection of the large purchasing power of the people in the city as it was of the size of the trading area. The high percentage of skilled workmen employed in the metalworking industries of Dayton resulted in the average weekly earnings of wage earners in manufacture in that city in 1940 being the highest in any of the largest eight

¹ National Resources Committee, The Structure of the American Economy (Washington: Government Printing Office, 1939), map, p. 8.

² National Recovery Administration, A Study of Natural Areas of Trade in the United States (Washington: Government Printing Office, 1935), map of Branch District 04-3; "Hagstrom's 4-Color Retail Trading Area Map of the United States" (New York: Hagstrom Co., Inc., n.d.); U. S. Bureau of Foreign and Domestic Commerce, Market Data Handbook of the United States (Washington: Government Printing Office, 1929), "Consumer Trading Areas" and "Retail Shopping Areas," maps in pocket.

manufacturing cities in Ohio.¹ The purchasing power of the agricultural population in the surrounding area was also relatively high.²

Springfield.--The 4,500 workers employed in retail trade in Springfield in 1939 was 6.3 per cent of the population, a smaller number than was characteristic of cities of comparable size in the East North Central states. The trade area ordinarily credited to Springfield included Clark, Champaign, and Logan counties. To some extent that trade area was also shared with Dayton, Piqua, Lima, and Columbus, Ohio. Eastern Greene County was also shared with Dayton, and though it was of considerable size and agriculturally quite productive, the population density was not high. Urbana and Bellefontaine, two local trade centers within the Springfield market area, also drew comparatively large amounts of trade in their sections of the Springfield area.

Smaller retail trade centers.--In Hamilton 5.5 per cent, in Franklin 6.0 per cent, in Middletown 6.4 per cent, and in Miamisburg 6.5 per cent of the population were engaged in retail trade. Those percentages were rather low, a result of the proximity of those cities to Cincinnati on the south and to Dayton on the north. The somewhat higher percentages in Middletown and Miamisburg, as contrasted with Hamilton and Franklin, were probably the outcome of higher densities of population in the urban-rural fringe immediately surrounding the former.

Retail Trade in Outlying Urban Centers

The percentage of population engaged in retail trade in the cities along the Miami River north of Dayton varied with distance from that city. Road distance from Dayton and percentages for those four cities were:

Tippecanoe City	15 miles	5.3 per cent
Troy	20 "	6.4 " "
Piqua	28 "	6.8 " "
Sidney	41 "	7.6 " "

¹"Housing Market Study of the Dayton, Ohio, Area" (A Collaborative Study by the Dayton City Plan Board and the National Housing Agency in co-operation with the Citizens' Housing Advisory Committee, August, 1945), p. 42. (Mimeographed.)

²O. E. Baker, A Graphic Summary of the Number, Size, and Type of Farm, and Value of Farm Products, U. S. Dept. of Agriculture, Misc. Pub. No. 266 (Washington: Government Printing Office, 1937), maps, pp. 61-62.

A similar relationship existed north of Springfield. Road distances from Springfield and percentages in that area were:

Urbana	14 miles	7.4 per cent
Bellefontaine	32 "	7.8 " "

It seems evident that in those cases the smaller centers lost trade to a larger one in greater amount as they were closer to it. That there was no simple mathematical relationship between the distances and the percentages is to be expected, for many other factors entered in to determine the amount of trade done in each urban center. Some of those factors were the purchasing power of the community, the nearness and number of smaller local trade centers, and the distance between the urban centers themselves.

In the other urban centers on the till plains the percentages of population engaged in retail trade varied from 9.4 per cent to 10.9 per cent. Those cities were primarily rural trading centers, and there seems to be no relation between the percentages engaged in retail trade in each center and the distances from larger trading centers.

Basis of Settlement: Wholesale Trade

About 2.7 per cent of the employed workers in the Valley in 1940 were employed in wholesale trade. Fifty-six per cent of them lived in Metropolitan Cincinnati and 13 per cent in Dayton, the only two wholesale centers of importance (Fig. 16). Wholesale workers in smaller towns and rural communities were engaged in such wholesale distribution as that of petroleum products, automotive supplies, beverages, and special food items, the kind of wholesale distribution found in smaller urban centers all over the nation.

Cincinnati as a Wholesale Trade Center

Cincinnati employed a somewhat larger percentage of its population in wholesale trade than did the other comparable centers, Indianapolis, Columbus, Toledo, or Louisville. In Metropolitan Cincinnati, wholesale trade furnished employment for about 3.4 per cent of the employed persons in 1940. The wholesale trade area served by Cincinnati was not so definite as that served by retail trade. Wholesale trade areas tended to differ with the kinds of goods sold, so that the territory in which Cincinnati

sold dry-goods was, for example, considerably larger than the one in which it sold groceries.¹ The wholesale trade area in which some types of goods were sold included considerable parts of Indiana, Ohio, West Virginia, Kentucky, and Tennessee. While that area was a large one, considerable parts of it, particularly to the south, had relatively low purchasing power.²

In the percentage of wholesale trade workers employed in distribution of paper, clothing, coal, lumber and construction materials, metal, machinery, electrical goods, and automotive supplies, Cincinnati was well above the national average. It was also above the national average in the numbers employed in manufacturers' branches and sales offices. It was below the national average in wholesale assembling of agricultural products, and in distribution of groceries, hardware, dry-goods, and furniture. In the other more important lines of wholesale trade the percentages employed were about normal.

Wholesale Trade in Dayton

A smaller percentage of the employed persons in Dayton were engaged in wholesale trade in 1940 than in Cincinnati, but 2.3 per cent being so employed. Although that city had a slightly higher percentage of its employed working in the wholesale trades than most other cities of comparable size in the East North Central states, Dayton was not an important wholesale center; its activities along that line being concerned primarily with meeting the needs of the local market.³ The scatter of employment among many lines of wholesale trade supports that view. Dayton was a secondary wholesale center in the Cincinnati area, though to a limited extent it supplied outlying retail centers in the northern part of the Miami Valley.

¹Elma S. Moulton, Atlas of Wholesale Grocery Trading Areas, U. S. Bureau of Foreign and Domestic Commerce, Market Research Series No. 19 (Washington: Government Printing Office, 1938), p. 14; Moulton, Atlas of Wholesale Dry-Goods Trading Areas, U. S. Bureau of Foreign and Domestic Commerce, Economic Series No. 12 (Washington: Government Printing Office, 1941), p. 40.

²National Resources Committee, op. cit.

³"Housing Market Study of the Dayton, Ohio, Area," op. cit., p. 8.

Basis of Settlement: Transportation
and Communication

Employment of 33,100 workers in transportation, communication, and other public utilities contributed to the support of about 6.3 per cent of the settlement in the Valley in 1940. The percentage of workers engaged in those types of work was slightly below the national average of 6.9. Though the Miami Valley was in the paths of considerable movements of goods from north to south and from east to west, still there was but one transportation center of outstanding significance, Cincinnati.

Cincinnati is a focus of railway lines between the North and the South and so is the most important railway transportation center in the Valley. The number of workers who lived in the city itself, some 4,900, was comparatively small and put Cincinnati at the bottom of the list when compared with other transportation centers of comparable size in the Mid-West. Adding the number residing in the Ohio suburbs raises the total to 6,600, and by including the Kentucky suburbs where the southern lines focused the total becomes 10,500, a much better indication of the significance of Cincinnati as a transportation center than is shown by the numbers resident within the city. That figure, slightly greater than the number of railway workers in Louisville and its Indiana suburbs, shows that Cincinnati and Louisville, the most important two crossing places of the Ohio River, were of about equal significance in 1940 as railway centers.

Cincinnati is also a focus of highway routes connecting North and South and is a center for trucking lines as well as for railways. In Metropolitan Cincinnati in 1940, 2,600 workers were employed in that business, a greater number than in any city of comparable size in the East North Central states and a considerably larger number of such workers than was found in Louisville at that time.

The largest employment in railway transportation in any city in the Valley except Cincinnati was at Bellefontaine where lived some 900 railway employees, about 28 per cent of all the employed persons in the town. Bellefontaine is an important junction point on the Big Four lines of the New York Central Railway system. Dayton and Springfield are in the line of considerable east-west railway traffic, traffic which, except for the necessary local facilities, is operated from transportation

centers outside the Valley. Columbus to the east and Indianapolis to the west, each had more than ten times as many railway workers as Dayton or Springfield. Except in Dayton, the percentage engaged in trucking service in the Middle Miami Valley cities was slightly above average.

The percentage of workers employed in communication in 1940 was very close to the national percentage and to that of other cities comparable in size. The percentage engaged in other public utilities was also very near to the national average, the Cincinnati percentage being slightly above that of such cities in the East North Central states. Electric generating stations located beside the Ohio River and securing coal by barge generate current for a considerable area surrounding the city and provide part of the power used in manufacturing in Hamilton and Middletown. Dayton also had a slightly higher percentage engaged in other public utilities than surrounding cities of comparable size. Dayton's manufacturing industries depend almost entirely on electric power generated by the public utilities in the city.

Basis of Settlement: Construction, Business,
Professional, and Personal Services

The number of persons engaged in construction in 1940 was 25,800, or 4.9 per cent of all workers, about the national urban average. Of that number 15,000 were in the eight larger cities. In Cincinnati construction workers comprised 5.0 per cent of all workers while the percentage in Springfield was 3.8 (Table 15), percentages in other cities falling between those two extremes. Employment in the building industry fluctuates rather rapidly so that the percentage of workers changes from year to year, consequently the differences between the cities in 1940 probably was of no great significance and the distribution of construction workers in the Valley a normal one.

Business, professional, and personal services employed 133,000 persons in 1940, 25.4 per cent of all the workers in the Valley, collectively more commonly engaged in cities than in rural areas. Metropolitan Cincinnati contained 51 per cent of the total and the four larger cities of the Middle Miami Valley 25 per cent. A large part of the remainder was found in the smaller cities and villages. The percentage of workers in those groups in the Valley was slightly higher than that for the East North Central states, a

result of the relatively large employment in personal service in Cincinnati.

Finance, insurance, and real estate occupied between 2.2 and 3.4 per cent of the employed persons in the smaller cities. No one of those smaller cities was outstanding in any one of those types of activity. Cincinnati, on the other hand, is a center of banking and insurance facilities, and the 4.8 per cent of all workers there so employed was, with one exception, larger than in any midwestern city of comparable size.

Business and automobile repair services which employed some 10,500 workers, mainly in automobile repairing, were more widely distributed in cities and country, the distribution of workers closely following that of population.

Professional services engaged 38,200 persons who were in part scattered in proportion to the population, since school teachers comprised a considerable number of that group. Other types of professional service tended to be grouped in the cities, with percentages varying from 6.3 to 9.6, the highest being found in Dayton and Cincinnati. The percentage in the larger city, 9.6, was considerably higher than the national urban average, for Cincinnati is a regional center in the fields of medicine, music, and the fine arts, an outgrowth in part, at least, of the large German element in its population.

Personal services occupied 8.6 per cent of all workers, which was lower than the national percentage but 1.3 per cent higher than that of the East North Central states. Workers in that group were concentrated chiefly in the cities for in urban centers, in contrast to smaller communities, a greater percentage of persons live in hotels and similar institutions where domestic service is provided them. In Cincinnati they constituted 10.6 per cent of the workers, in Dayton and Springfield 8.3 per cent, in Hamilton 7.9 per cent. The percentage in Cincinnati was higher than in other Northern cities of similar size, the percentage there being intermediate between that of Northern and Southern cities.

Occupations connected with amusement and recreation employed 4,500 persons, which constituted a normal percentage of the total employed. They were not distributed in direct relation to the population, the proportion so engaged in the larger towns being greater than in the smaller ones. Government employees were

to a considerable degree concentrated in the county seats; their numbers, however, were not in direct relation to the population of the counties. The location of Federal Government airfields in Greene County near Dayton explains the higher than normal percentage of government workers in Dayton and Greene County.

Settlement After One Hundred and Fifty Years

The outstanding feature in the distribution of settlement in the Miami Valley in 1940 was the line of cities with its surrounding zone of densely settled rural area which extended from Cincinnati to Springfield. A minor but significant feature was the line of smaller cities along the Miami River north of Dayton. Small as the Valley is, it contained in 1940 1 per cent of the population of the United States and on a map showing the distribution of national settlement it stands out as a dark island at the junction of three lines of urban settlement. One of those lines in which Cincinnati lies consists of rather widely spaced cities along the Ohio and Mississippi rivers from Pittsburgh to New Orleans. A second line, along which the cities are more closely spaced, extends from Pittsburgh to St. Louis and includes Springfield and Dayton. The third, a north-south line, stretches from Cincinnati to Detroit with all the Miami River cities from Hamilton to Sidney lying in it.

It is well to emphasize the connection of the Valley with those lines of cities for they mark pathways of movement, and the development of the settlement pattern of the Miami Valley has been characterized by adjustment to the changing significance of those pathways. The soil is the greatest resource in the Valley and it was inevitable that agriculture should have been the basis of the original settlement, but while agricultural development was still far from its maximum, the development of trade and of manufacturing was begun.

During one hundred and fifty years the settlement of the Miami Valley in many ways paralleled that of other sections of the Eastern Interior Lowland. It differed from nearby sections, however, in the greater amount of urban growth, based primarily on the much greater development of manufacturing in the Valley than in neighboring areas. Manufacturing in turn was an outgrowth of the early leadership in trade, for the location of the Valley at the great northern bend of the Ohio River was one which brought it

within reach of lands to the north as well as giving it connection with the West and the South.

While manufacturing was the basic support of the urban settlement in 1940, the trade functions of Metropolitan Cincinnati extended in a modest way beyond the limits of the Valley. The number supported by agriculture was small compared with the number supported in other ways, though the area was a relatively productive one. Very considerable numbers of persons depended on employment in the various service industries which are a part of the complex structure of modern living. The proportion of such workers and their distribution among the various groups was a fairly normal one.

After one hundred and fifty years the outstanding features of the settlement pattern of the Valley seem to be firmly established. The urban centers of 1940 were the urban centers of 1840. There were no unused agricultural areas remaining in which development might take place. The urban-rural fringe is a newer development and one which seems likely to grow, but its growth will be but a widening of and increasing density in the already delineated zone. The future seems likely to bring minor rather than major changes.

APPENDIX

NOTES ON FIGURES

Figure 1. The base is from the road map Ohio and Adjacent States (Chicago: Socony-Vacuum Oil Co., Inc., 1942).

Figure 2. The base for all maps of the Miami Valley is from U. S. Census Bureau, Ohio--Minor Civil Divisions, scale 1:500,000 (Washington: Government Printing Office, 1942), with rivers added from U. S. Geological Survey, The State of Ohio, scale 1:500,000 (Washington: Government Printing Office, 1944). The number of persons per square mile for 1940 was determined by townships from census data on population in U. S. Bureau of the Census, Sixteenth Census of the United States: 1940, Population, Vol. I (Washington: Government Printing Office, 1942), pp. 818-827, and from areas in U. S. Bureau of the Census, Sixteenth Census of the United States: 1940, Areas of the United States, 1940 (Washington: Government Printing Office, 1942). Populations and areas of all incorporated villages and cities indicated on the maps were excluded from the calculations for all maps showing distribution of settlement. On all settlement maps the circle centered on Cincinnati is for Metropolitan Cincinnati as defined in the footnote on page 3. The circle centered on Dayton in Figures 2 and 13 includes both Dayton and Oakwood.

Figure 3. The map of land forms was compiled from many sources. A key to the nature of the land forms in the Valley is found in Fenneman's Geology of Cincinnati and Vicinity and Physiography of Eastern United States. Other sources of information used include the Report of the Ohio Geological Survey published in the 1870's and Fourth Series Bulletins of the same organization, soil surveys used in connection with A Key to the Soils of Ohio, Plate II in Water Supply Paper No. 259, and the U. S. Geological Survey's topographic quadrangles of the entire Valley.

Figure 4. The dates of the building of railways were obtained from the annual reports of the Ohio Commissioner of Railroads and Telegraphs and county histories. The dates were checked by the examination of state and county maps for various years.

Figure 5. The locations of the settlements in 1794 were taken from descriptions in the Hamilton County histories.

Figure 6. The location of the frontier in this map as well as in Figure 8 was determined from records of first settlement taken from county histories. The dates of establishment of the villages and location of the roads were obtained from the same sources.

Figure 7. The base is from the Brookville and Dayton, Ohio, quadrangles of the U. S. Geological Survey. The dates of land purchase are taken from A. W. Drury, History of the City of Dayton and Montgomery County, Ohio, Vol. I (Chicago: S. J. Clark Publishing Co., 1909), pp. 914-928.

Figure 8. The calculations of the number of persons per square mile were based on the number of inhabitants by townships given in U. S. Census Office, Third Census of the United States: 1810 (Washington: U. S. Census Office, 1811), pp. 57a-68a, and the areas of townships were measured from maps of townships which were drawn from data obtained from county records and histories.

Figure 9. The areas of the townships were determined in the same way as they were for Figure 8. Population data were taken from U. S. Census Office, Seventh Census of the United States: 1850 (Washington: R. Armstrong, 1853), pp. 821-849.

Figure 10. The population data are from U. S. Census Office, Twelfth Census of the United States: 1900, Vol. I (Washington: U. S. Census Office, 1901), pp. 306-320. The areas of the townships were taken from the same source as those used for Figure 2, though adjusted for changes caused by annexation of territory to the cities.

Figure 12. The data were taken from U. S. Census Office, Twelfth Census of the United States: 1900, Vol. VIII, Part 2 (Washington: U. S. Census Office, 1902), pp. 690-691. The figures given on the map include the number of wage earners plus the number of proprietors and firm members.

Figure 13. The population data were taken from U. S. Bureau of the Census, Fifteenth Census of the United States: 1930, Population, Vol. I (Washington: Government Printing Office, 1931), pp. 844-862. The areas of the townships were taken from the same sources as those used in Figure 2, though adjusted for changes caused by the annexation of territory to the cities.

Figure 14. The data were taken from Directory of Manu-

factures in Ohio, 1939 (Columbus: Department of Industrial Relations, n.d.), pp. 157-323. The number of workers given on the map includes all classes of employees as reported by the manufacturers. The figures are for the week of greatest employment during the year, according to a letter dated June 10, 1946, from Mr. Chas. D. Scudder, Chief, the Division of Labor Statistics, Ohio Department of Industrial Relations.

Figure 15. The number of agricultural workers per square mile was determined by townships. Since census data give the number of workers by counties only, county totals were distributed among the townships in proportion to the rural farm-population. The data were taken from U. S. Bureau of the Census, Sixteenth Census of the United States: 1940, Population, Vol. II, Part 5 (Washington: Government Printing Office, 1942), pp. 612-617, 620-649. The number of agricultural workers includes farmers, farm managers, farm laborers, farm foremen, and unpaid family laborers of both sexes.

Figure 16. The data were taken from the U. S. Bureau of the Census, Sixteenth Census of the United States: 1940, Census of Business: 1939, Vol. I, Part 3 (Washington: Government Printing Office, 1941), pp. 546-548, and Vol. II (1942), pp. 997-998. The figures used include the number of active proprietors, salaried employees, and wage earners.

BIBLIOGRAPHY

- Annual Report of the Commissioner of Patents for the Year 1847.
U. S. Congress, House of Representatives, 30th Cong., 1st Sess., House Executive Document 54. Washington: Wendell and Van Benthuysen, 1848.
- Annual Report of the Commissioner of Patents for the Year 1848.
U. S. Congress, House of Representatives, 30th Cong., 2d Sess., House Executive Document 59. Washington: Wendell and Van Benthuysen, 1849.
- Annual Report of the Commissioner of Statistics for 1857. Columbus: Richard Nevins, 1858.
- Annual Report of the Secretary of State for the Year 1865. Columbus: Richard Nevins, 1866.
- Annual Report of the Secretary of State for the Year 1870. Columbus: Nevins and Meyers, 1870.
- Annual Report of the Secretary of State for the Year 1880. Columbus: G. J. Brand and Co., 1881.
- Baker, O. E. A Graphic Summary of the Number, Size, and Type of Farm, and Value of Farm Products. U. S. Department of Agriculture, Miscellaneous Publication 266. Washington: Government Printing Office, 1937.
- Bartlow, B. S., and others (eds.). Centennial History of Butler County, Ohio. Indianapolis: B. F. Bowen and Co., 1905.
- Broadstone, M. A. History of Greene County, Ohio. Indianapolis: B. F. Bowen and Co., 1918.
- Burkett, Charles W. History of Ohio Agriculture. Concord, N. H.: The Rumford Press, 1900.
- The Cincinnati Directory for the Years 1836-37. Cincinnati: J. H. Woodruff, 1836.
- Cist, Charles. Cincinnati in 1841. Cincinnati: n. p., 1841.
- _____. Sketches and Statistics of Cincinnati in 1851. Cincinnati: Wm. H. Moore and Co., 1851.
- The City of Cincinnati and Its Resources. Cincinnati: Cincinnati Times Star Co., 1891.
- Conrey, G. W., and Paschall, A. H. A Key to the Soils of Ohio. Special Circular No. 44. Wooster: Ohio Agricultural Experiment Station, 1934.
- Crew, Harvey W. History of Dayton, Ohio. Dayton: The United Brethren Publishing House, 1889.
- Department of Industrial Relations. Directory of Manufactures in Ohio: 1939. Columbus: Department of Industrial Relations, n. d.
- Directory of Preble County, Ohio, for 1875. Eaton, Ohio: B. F. Morgan, 1875.

- Downes, R. C. "Evolution of Ohio Boundaries," Ohio Archaeological and Historical Quarterly, Vol. XXXVI (1927), pp. 340-477.
- . Frontier Ohio, 1788-1803. Columbus: Ohio State Archaeological and Historical Society, 1935.
- Drake, Benjamin, and Mansfield, E. D. Cincinnati in 1826. Cincinnati: Morgan, Lodge, and Fisher, 1827.
- Drake, Daniel. Natural and Statistical View, or Picture of Cincinnati and the Miami Country. Cincinnati: Looker and Wallace, 1815.
- Drury, A. W. History of the City of Dayton and Montgomery County, Ohio. Vol. I. Chicago: S. J. Clark Publishing Co., 1909.
- Edgar, J. F. Pioneer Life in Dayton and Vicinity, 1796-1840. Dayton: Dayton Flood Book Co., 1915.
- Ezekiel, Mordecai. "Population and Unemployment," Annals of the American Academy of Political and Social Science, November, 1936, pp. 230-242.
- Fenneman, Nevin C. Geology of Cincinnati and Vicinity. Fourth Series, Bulletin 19. Columbus: Geological Survey of Ohio, 1916.
- . Physiography of Eastern United States. New York: McGraw-Hill Book Co., Inc., 1938.
- Fifteenth Annual Report of the Ohio State Board of Agriculture for the Year 1860. Columbus: Richard Nevins, 1861.
- Fifty-first Annual Report of the Cincinnati Chamber of Commerce and Merchants' Exchange for the Year Ending December 31, 1899. Cincinnati: The Ohio Valley Co., 1900.
- Ford, H. A., and Ford, Mrs. K. B. History of Cincinnati, Ohio. Cleveland: L. A. Williams and Co., 1881.
- . History of Hamilton County, Ohio. Cleveland: L. A. Williams and Co., 1881.
- Fuller, M. L., and Clapp, F. G. Underground Waters of Southwestern Ohio. U. S. Geological Survey, Water Supply Paper No. 259. Washington: Government Printing Office, 1912.
- Goss, Charles Frederic. Cincinnati the Queen City. Vols. I and II. Chicago: S. J. Clarke Publishing Co., 1912.
- Hall, James. Statistics of the West. Cincinnati: J. A. James and Co., 1836.
- Harbaugh, Thomas Chalmers. Centennial History, Troy, Piqua, and Miami County, Ohio. Chicago: Richmond Arnold Publishing Co., 1909.
- History of Brown County, Ohio. Chicago: W. H. Beers and Co., 1883.
- A History and Biographical Cyclopedia of Butler County, Ohio. Cincinnati: Western Biographical Publishing Co., 1882.
- History of Champaign County, Ohio. Chicago: W. H. Beers and Co., 1881.
- History of Cincinnati and Hamilton County, Ohio. Cincinnati: S. B. Nelson and Co., 1894.
- History of Clark County, Ohio. Chicago: W. H. Beers and Co., 1881.

- History of Clermont County, Ohio. Philadelphia: L. H. Evarts, 1880.
- History of Clinton County, Ohio. Chicago: W. H. Beers and Co., 1882.
- History of Logan County, Ohio. Chicago: O. L. Baskin and Co., 1880.
- History of Miami County, Ohio. Chicago: W. H. Beers and Co., 1880.
- History of Preble County, Ohio. Cleveland: H. Z. Williams and Brother, 1881.
- History of Ross and Highland Counties, Ohio. Cleveland: Williams Bros., 1880.
- History of Shelby County, Ohio. Philadelphia: R. Sutton and Co., 1883.
- History of Warren County, Ohio. Chicago: W. H. Beers and Co., 1882.
- "Housing Market Study of the Dayton, Ohio, Area." A Collaborative Study by the Dayton City Plan Board and the National Housing Agency in Co-operation with the Citizens' Housing Advisory Committee, August, 1945. (Mimeographed.)
- Hulbert, Archer B. Historic Highways of America. Vol. IX. Cleveland: A. H. Clark Co., 1903.
- Huntington, C. C., and McClelland, C. P. History of Ohio Canals. Dayton: The Ohio State Archaeological and Historical Society, 1905.
- Industrial Commission of Ohio. Directory of Ohio Manufacturers, 1918. Columbus: F. J. Herr Printing Co., 1918.
- Industrial Survey of Cincinnati, Vocational Section, Garment Making Industries. Cincinnati: Cincinnati Chamber of Commerce, 1916.
- Kilbourn, J. Ohio Gazetteer or Topographical Dictionary. 11th ed. Columbus: J. Kilbourn, 1833.
- Lippincott, Isaac. A History of Manufacturing in the Ohio Valley to the Year 1860. New York: The Knickerbocker Press, 1914.
- Lloyd, W. A., Falconer, J. I., and Thorne, C. E. History of Ohio Agriculture. Bulletin 326. Wooster: Ohio Agricultural Experiment Station, 1918.
- Marquis, A. N. (ed.). The Industries of Cincinnati. Cincinnati: A. N. Marquis and Co., 1883.
- McClung, D. W. (ed.). Centennial History of the City of Hamilton, Ohio. Hamilton, Ohio: Centennial Publishing Co., 1892.
- Moulton, Elma S. Atlas of Wholesale Dry Goods Areas. U. S. Bureau of Foreign and Domestic Commerce, Economic Series No. 12. Washington: Government Printing Office, 1941.
- _____. Atlas of Wholesale Grocery Trading Areas. U. S. Bureau of Foreign and Domestic Commerce, Market Research Series No. 19. Washington: Government Printing Office, 1938.
- National Recovery Administration. A Study of Natural Areas of Trade in the United States. Washington: Government Printing Office, 1935.
- National Resources Committee. The Structure of the American

- Economy. Washington: Government Printing Office, 1939.
- _____. Our Cities: Their Role in the National Economy. Washington: Government Printing Office, 1937.
- Ohio Geological Survey. Report. Vol. I, Part 1, Geology. Columbus: Nevins and Meyers, 1873.
- _____. Report. Vol. II, Part 1, Geology. Columbus: Nevins and Meyers, 1874.
- _____. Report. Vol. III, Part 1, Geology. Columbus: Nevins and Meyers, 1878.
- Peattie, Roderick. Geography of Ohio. Fourth Series, Bulletin 27. Columbus: Geological Survey of Ohio, 1923.
- Prince, B. F. (ed.). The Centennial Celebration of Springfield, Ohio. Springfield: Springfield Publishing Co., 1901.
- _____. A Standard History of Springfield and Clark County, Ohio. Chicago: American Historical Society, 1922.
- Robinson, George F. History of Greene County, Ohio. Chicago: S. J. Clarke Publishing Co., 1902.
- Scott, Daniel. History of the Early Settlement of Highland County, Ohio. Hillsboro, Ohio: The Gazette, 1890.
- Sherman, C. E. Ohio Topographic Survey, Final Report. Vol. III. Columbus: Ohio State Reformatory, 1925.
- Sitterly, J. H., and Falconer, J. I. "Better Land Utilization for Ohio." Ohio State University and Ohio Agricultural Experiment Station, Department of Rural Economics, Mimeographed Bulletin No. 108. Columbus, 1938.
- Stauffer, Clinton R., Hubbard, George D., and Bownocker, J. A. Geology of the Columbus Quadrangle. Fourth Series, Bulletin 14. Columbus: Geological Survey of Ohio, 1911.
- Tenth Annual Report of the Commissioner of Railroads and Telegraphs of Ohio for the Year Ending June 30, 1876. Columbus: Nevins and Meyers, 1877.
- Thompson, Warren S. The Population of the Cincinnati Metropolitan Area. Cincinnati: City Planning Commission, 1945.
- Twelfth Annual Report of the Commissioner of Railroads and Telegraphs of Ohio for the Year Ending June 30, 1879. Columbus: Nevins and Meyers, 1880.
- Twelfth Annual Report of the Ohio State Board of Agriculture for the Year 1857. Columbus: Richard Nevins, 1858.
- Twenty-seventh Annual Report of the Ohio State Board of Agriculture for the Year 1872. Columbus: Nevins and Meyers, 1873.
- Twenty-sixth Annual Report of the Ohio State Board of Agriculture for the Year 1871. Columbus: Nevins and Meyers, 1872.
- U. S. Bureau of the Census. Thirteenth Census of the United States: 1910. Vols. III, VII. Washington: Government Printing Office, 1913.
- _____. Thirteenth Census of the United States: 1910. Vol. IX. Washington: Government Printing Office, 1912.
- _____. Fourteenth Census of the United States: 1920. Vol. I. Washington: Government Printing Office, 1921.

- . Fourteenth Census of the United States: 1920. Vol. IX. Washington: Government Printing Office, 1923.
- . Biennial Census of Manufactures: 1927. Washington: Government Printing Office, 1930.
- . Fifteenth Census of the United States: 1930. Population, Vol. I. Washington: Government Printing Office, 1931.
- . Fifteenth Census of the United States: 1930. Population, Vol. III, Part 2. Washington: Government Printing Office, 1932.
- . Fifteenth Census of the United States: 1930. Manufactures: 1929, Vol. III. Washington: Government Printing Office, 1933.
- . Fifteenth Census of the United States. Census of Agriculture. Types of Farming in the United States. Washington: Government Printing Office, 1933.
- . Biennial Census of Manufactures: 1937. Part II. Washington: Government Printing Office, 1939.
- . Sixteenth Census of the United States: 1940. Population, Vol. I. Washington: Government Printing Office, 1942.
- . Sixteenth Census of the United States: 1940. Population, Vol. II, Part 5. Washington: Government Printing Office, 1943.
- . Sixteenth Census of the United States: 1940. Manufactures: 1939, Vol. II. Washington: Government Printing Office, 1942.
- . Sixteenth Census of the United States: 1940. Census of Business: 1939, Vol. I, Part 3. Washington: Government Printing Office, 1941.
- . Sixteenth Census of the United States: 1940. Census of Business: 1939, Vol. II. Washington: Government Printing Office, 1942.
- . Sixteenth Census of the United States: 1940. Agriculture, Vol. I, Part 1. Washington: Government Printing Office, 1942.
- . Sixteenth Census of the United States: 1940. Agriculture, Drainage of Agricultural Lands. Washington: Government Printing Office, 1942.
- . Sixteenth Census of the United States: 1940. Areas of the United States, 1940. Washington: Government Printing Office, 1942.
- . A Century of Population Growth from the First Census of the United States to the Twelfth, 1790-1900. Washington: Government Printing Office, 1909.
- U. S. Bureau of Chemistry and Soils. Soil Survey of Brown County, Ohio. Washington: Government Printing Office, 1936.
- . Soil Survey of Butler County, Ohio. Washington: Government Printing Office, 1931.
- . Soil Survey of Clermont County, Ohio. Washington: Government Printing Office, 1928.

- _____. Soil Survey of Hamilton County, Ohio. Washington: Government Printing Office, 1917.
- _____. Soil Survey of Logan County, Ohio. Washington: Government Printing Office, 1939.
- _____. Soil Survey of Miami County, Ohio. Washington: Government Printing Office, 1918.
- _____. Soil Survey of Montgomery County, Ohio. Washington: Government Printing Office, 1900.
- U. S. Bureau of Foreign and Domestic Commerce. Market Data Handbook of the United States. Domestic Commerce Series No. 30. Washington: Government Printing Office, 1929.
- _____. The Men's Factory Made Clothing Industry. Miscellaneous Series No. 34. Washington: Government Printing Office, 1916.
- U. S. Census Office. Third Census of the United States; 1810. Washington: U. S. Census Office, 1811.
- _____. Fourth Census of the United States; 1820. Washington: Gales and Seaton, 1821.
- _____. Fifth Census of the United States; 1830. Washington: D. Green, 1832.
- _____. Sixth Census of the United States; 1840. Washington: Blair and Rives, 1841.
- _____. Seventh Census of the United States; 1850. Washington: R. Armstrong, 1853.
- _____. Eighth Census of the United States; 1860. Population. Washington: Government Printing Office, 1864.
- _____. Eighth Census of the United States; 1860. Manufactures. Washington: Government Printing Office, 1865.
- _____. Ninth Census of the United States; 1870. Vols. I-III. Washington: Government Printing Office, 1872.
- _____. Tenth Census of the United States; 1880. Vols. I-III. Washington: Government Printing Office, 1883.
- _____. Tenth Census of the United States; 1880. Vol. XVII. Washington: Government Printing Office, 1886.
- _____. Eleventh Census of the United States; 1890. Vol. I. Washington: Government Printing Office, 1895.
- _____. Twelfth Census of the United States; 1900. Vol. I. Washington: Government Printing Office, 1901.
- _____. Twelfth Census of the United States; 1900. Vol. II, Part 2, Vols. VII, VIII, X. Washington: Government Printing Office, 1902.
- _____. Twelfth Census of the United States; 1900. Special Reports, Supplementary Analysis and Derivative Tables. Washington: Government Printing Office, 1906.
- Williams, Byron. History of Clermont and Brown Counties, Ohio. Milford, Ohio: Hobart Publishing Co., 1913.
- Wilson, E. Frazer. History of Darke County, Ohio. Vol. I. Milford, Ohio: Hobart Publishing Co., 1914.
- Wittke, Carl (ed.). The History of the State of Ohio. 6 vols.

Columbus: Ohio State Archaeological and Historical Society, 1941-43.

Wright, Alfred J. "The Industrial Geography of the Middle Miami Valley, Ohio," Papers of the Michigan Academy of Science, Arts and Letters, Vol. XXI (1935), pp. 417-418.

Wright, Carrol D., and Hunt, William C. The History and Growth of the United States Census. U. S. Congress, Senate, 56th Cong., 1st Sess., Senate Document No. 194. Washington: Government Printing Office, 1900.

